

LEADERSHIP IN THE ERA OF  
THE HUMAN SINGULARITY:  
NEW DEMANDS, NEW SKILLS,  
NEW RESPONSE

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# **LEADERSHIP IN THE ERA OF THE HUMAN SINGULARITY: NEW DEMANDS, NEW SKILLS, NEW RESPONSE**

by

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## EXECUTIVE SUMMARY

The “human singularity” refers to the integration of technology into the human body so that levels of mental acuity and physical ability eclipse all previous known levels. Because of the unique character of these enhanced human specimens, they will represent a singularity in human history, something unique and to which a new set of laws may well apply. A broad front of converging core technologies, such as nanotechnology, bioengineering, supercomputing, materials development, and robotics, may make such individuals commonplace by 2030; indeed, significant steps have already been taken to achieve this goal, and the singularity could arrive earlier.

The rise of the singularity and the resulting Enhanced Singular Individuals (henceforth referred to as “ESIs”), capable of outsized mental and physical performance, will have a major impact on the practice of leadership, a major factor in determining whether a society succeeds or fails. The impact of the singularity has often been described in overly simplified “techutopian” scenarios or super-hero fantasies. In fact, the singularity will override the parameters that traditionally define human performance, changing society in complex and subtle ways.

With the arrival of the singularity, society will experience novel models of leadership and its associated skills. It will require new types of training to address new leadership challenges as society learns more about ESIs’ character and capabilities. It is important to identify who is likely to become an ESI and how, their relationship to the rest of the population, and the roles they will play within organizations. Throughout it all, the leadership function is a central defining factor of a society, its values, and its response to the appearance of a sub-population with extraordinary gifts.

To address such issues, it is critical to have a working context and vocabulary by which to address leadership issues. The 9-Phase Leadership Model contains a precise vocabulary and framework for analyzing how social and technological change affect the function and

practice of leadership. It is based on the internal structure, dynamics, and governance of society at its various evolutionary stages and offers a more complete evaluation of leadership than do more situationally or interpersonally based models. The 9th Phase represents the Era of the Singularity; the other 8 Phases are each associated with distinct objectives, tasks, methods, and structures. An approach to leadership training and education based on each Phase can improve leadership skills immediately and also prepare institutions for the distensions and upheavals that the singularity and its associated technologies will entail. This approach can also be applied immediately to contemporary leadership training, where it will accelerate the adoption of innovative leadership approaches for a volatile world.

Two hypothetical future scenarios supplement the many examples in the text that clarify the challenges posed by the singularity. The scenarios depict 1) the impact of ESIs on the leader of an intelligence agency department, and 2) the level of unknowability and uncertainty the post-singularity world poses for us. The specific application of the inquiry to the intelligence community carries with it a host of future options in terms of practice, strategy and planning, and organizational development. To facilitate the anticipated transitions, a set of recommendations prepares leaders for the challenges of the Singularity Era while enabling organizations to dramatically improve present day leadership training.

# **LEADERSHIP IN THE ERA OF THE HUMAN SINGULARITY: NEW DEMANDS, NEW SKILLS, NEW RESPONSE**

## **Introduction**

“We mustn’t be caught by surprise by our own advancing technology... people find themselves in situations they have not foreseen and they have no idea what to do.” Aldous Huxley in interview by Mike Wallace, May 15, 1958, CBS TV.

Within two decades, technology will likely give human beings unprecedented mental and physical abilities, a phenomenon dubbed the “singularity” by Vernon Vinge (1993). The theme has been given both substance and visibility by Vinge (2008) and inventor and futurist Ray Kurzweil (2005). The term “singularity” was previously applied to astronomy’s black holes, in which the laws of physics as we understand them no longer function; hence, the black hole is a “singularity,” with singular laws. Similarly, with the singularity, humanity will be heading into uncharted territory whose highly-talented denizens raise the specter that human beings will be rendered obsolete in important ways or, as in darker science-fiction scenarios, superseded by an act of rebellion on the part of super-intelligences better suited than we to the Darwinian steeplechase.

The implications of the singularity have only begun to be addressed. Kurzweil is a leading proponent of the “techutopian” future of spiritual machines, re-engineered brains, and hyper-attenuated lifelines (Kurzweil, 2005). Bill Joy’s somewhat controversial statement of concern about the dystopian possibilities of the singularity ends with a tentatively optimistic hope that we can redefine our notions of happiness, rediscover the power of altruism, or simply relinquish our technological aspirations (Joy, 2000). These perspectives are very useful, especially in helping us visualize the future landscape and persuade people of its impending reality. Such general utopian, techutopian, and dystopian scenarios allow us to visualize the terrain, but their level of generality



can blur the picture as well. The profound social and psychological pressures engendered by even one aspect of this change—extended longevity, for example—remain unexplored.

This inquiry aims to initiate a more searching appraisal of the social implications of the coming singularity, its impact on the nature and practice of leadership, the social dimensions consequent upon a shift in leadership norms, and the type of preparation that institutions can implement in anticipation of this intriguing and unique set of future developments. The hope is that readers will find material here sufficient to cause them to incorporate singularity-related issues into their strategic planning and leadership training in order to prepare for a volatile and uncertain future and to enrich current approaches to leadership training and education.

## I. The Elemental Nature of Leadership

Leadership is a key variable in determining the functionality of any group and hence a logical starting point for considering the singularity's impact on society. Leadership developed within both mammal and early human bands because it was an efficient survival and social-enhancement mechanism. Leadership, like social bonding, increases the ability of a group to pursue the underlying objectives of human life: 1) survival, essentially defensive in nature; 2) extension (more wealth, territory, etc.) and 3) enhancement (better water supply; larger, airier shelters). The latter two are offensive because their goal is to incorporate new energies into a system. Leaders play a central role in organizing and directing group energies towards defending, asserting, and achieving the group's intentions in the face of attack or resistance, which often mean the same thing (i.e., a new environment resists a tribe's settlement due to the attacks of a hostile tribe or local disease). Resistance comes in three broadly defined categories: 1) natural forces such as death, disease, gravity, climate, geography, hostile animals, etc., 2) other humans, and 3) limitations innate to our physical and cognitive capacities. The three can be summed up by the terms 1) nature, 2) society, and 3) self. *The singularity will shift age-old balances of power in all three domains.*

Leadership is by nature strategic, willful, future-oriented, and intrinsic to organic life. It first reveals itself in the impulse to create pattern and rhythm out of the most primitive organisms' primary perceptions; later, in complex organisms, the brain develops to assume a governing or leadership role within the organism. Leadership is inseparable from the drive to actualization and fulfillment. Without it, no community survives, but this does not mean that the most concentrated leadership is the most effective. Egalitarianism, democracy, representative republicanism, or meritocracy are certainly preferable to totalitarianism. However structured, leadership defines a group, community, or society in a way few factors can. A community displays its values, assumptions about human nature, aspirations, relationship to the natural environment, and quality of social intercourse by the way its members assign, assert, and acquiesce to leadership. That said, certain constants of leadership can be identified across most societies. Leaders generally:

1. Have higher status than non-leaders.
2. Own or control more goods and resources than non-leaders.
3. Affect more people with their decisions than non-leaders.
4. Become a focus for the proliferation of group-wide symbols, rituals, and narratives.
5. Can be considered to be anyone who demonstrates the ability to effect change.
6. Have a greater ability to change how society is organized than non-leaders.
7. Define by their positions the configuration of social space.
8. Embody core assumptions, beliefs, impulses, and behaviors of a group or society.
9. Can mobilize more members of society, resources, and institutions in service to their own objectives than others can.
10. Incur more public wrath when they fail than is leveled at those who fail at other activities.

The scope of these constants demonstrates how deeply leadership is embedded in core social processes and dynamics, and the disruption that a sea change in the culture of leadership, and the human traits that shaped leadership for millennia, is likely to cause. Anticipating such changes can prepare us for them. Re-imagining leadership in

the light of the presence of exceedingly high-functioning people (the ESIs) enables us to look past our long-standing assumptions about leadership and view it afresh in terms of today's needs as well as the future's. Singularity or not, we face immense social and environmental change in the coming years. Today it is critical to develop new models of leadership, when technology and globalization already present us with a host of unique and unfamiliar challenges.

## II. The Nature of the Singularity

The singularity will change our ideas of humanness. It may be tempting to compare ESIs to comic book and movie fiction superheroes, whose depictions do often contain acute social and psychological insights. To do so, however, would stereotype ESIs and distort our understanding of them and their effect on society. Defining some basic boundary conditions clarifies who ESIs will be and the social roles they might play.

- ESIs will not be “superhero” personae with one virtually limitless gift, nor will they mostly be robotic cyborgs or other popular stereotypes, but will be of many different types.
- Some ESIs will have one talent, while others will possess generally enhanced physical and/or mental abilities that they can apply in different ways.
- ESIs' special abilities will be integrated into their daily lives; they won't enter phone booths to transform themselves dramatically. Their gifts are part of their identities, just as an athlete's skills remain with her after she leaves the arena.
- ESIs will change our notions of psychology. Unlike the superhero's two distinct personalities operating in two separate spheres, ESIs will be subject to new, complex, and unpredictable psychological and social patterns.
- ESIs will represent a growing portion of the population, not simply a small fraction or occasional genius, and this shift in how ability is distributed will transform society and longstanding notions of excellence and achievement.

In short, the singularity will qualitatively change our idea of what it is to be human and will change society in unforeseen ways.

### ***Skill Sets***

“But when something new occurs, then distant and strange things become obvious and inevitable.” (Przewoznik and Soszynski, p. 6). ESIs will possess a range of abilities in different combination, listed under three general categories—mental, perceptual, and physiological:

#### **Mental**

- Higher intelligence.
- Ability to read others’ thoughts.
- Exceptional ability to learn and memorize.
- Mind over matter (mediated by technology), i.e., direct control of machines via thought.
- Mental integration into a wide variety of institutional and information networks.
- Mind-to-mind interfaces; mind-sharing and group-minds.
- Exploration of “higher” states of consciousness and “psychic” powers.
- Ability to interfere or intervene with others’ neural processes or one’s own.
- Completely new areas of learning and exploration—hidden worlds revealed.
- Ability to generate mental models more similar to complex simulations than the diagrammatic schemata we generally use—“juggling with six arms.”

#### **Perceptual**

- Hyper-enhanced senses.
- Remote extensions of sense, i.e., ability to smell at a distance.
- Interventions in processes between initial sensory input and brain to enhance perception.

- Extra-sensory, “sixth, seventh, and eighth senses” (Axel, 2004).
- Extreme proprioception, i.e., sensory awareness of internal bodily processes, with enhanced ability to control them.
- Sharing the sensory experience of others in real time.
- Ability to direct chi, or ki, subtle vital energies associated with tantric and martial arts practices.

### Physiological

- Every bodily system more efficient and powerful.
- Significant advances in longevity.
- New levels of mind/body integration.
- Super-muscles—speed, strength, agility, flexibility, coordination, elasticity.
- Robotic implants of organs as well as bones, muscles, ligaments, etc.
- Cross-species genetic implants for strength and new mental perspectives.
- New limbs—artificial, regrown, genetically engineered, nano-enhanced.
- Increased speed at which signals travel along and between nerve cells.
- Greater ability to withstand cold, pain, and extreme deprivations.
- Faster reaction times, superior balance.
- Regulation of key bodily functions: temperature, heart rate, immune system.

### *Access to ESI Technology*

Who is likely to become ESIs? Will the first ones be everyday citizens, corporate trainees, soldiers? Will enhancements be highly restricted or available on the open market? Factors determining such access include cost, potential destructive power, black market conditions, complexity of “installation,” possible side-effects, government restrictions and

regulations, intellectual property issues, social acceptability, corporate exclusivity, social desirability of the enhancement and the risk of social ostracism once one adopts it, resistance to subjecting one's personality to radical change, reliability of the technology, and level of proof that the enhancement can produce dramatic and/or reliable results. Once ESIs enter the mainstream, these variables will come into play, each one subject to significant volatility. A single well-publicized success or failure early on will affect society's perceptions of the singularity, but such reactions are likely to be short-term as ESIs become a familiar part of daily life.

The first waves of ESIs will likely emerge from military and corporate research labs. Aside from soldiers, first adopters will tend to be wealthy people already pursuing quality-of-life enhancements. The technology, however, will inevitably become less exclusive because it is being developed within so many industries. Once less expensive (perhaps limited) versions of the technologies become available, the more adventurous will experiment with them, both legally and not. The cost of technology will decline as manufacturing improves; once it crosses a certain cost threshold, the singularity will have fully arrived. Unlike nuclear energy, for example, singularity technology is advancing on many fronts, which will bring costs down rapidly; some ESI-tech will be no more costly than steroids or cosmetic surgery today, and will prove just as popular.

### ***Enhanced Singular Individuals: The Freaked, the Tweaked, and the Geeked***

The human singularity emerges when a dramatic increase in quantitative power generates unforeseen qualitative effects. A less compressed version of this is J. Storrs Hall's (2006) definition of the singularity as, "That point where intelligences significantly greater than our own control so many of the essential processes that figure in our lives that mere humans can't predict what happens next." For example, if a person's intelligence suddenly outstrips Einstein's, their personality and other skills will change in unpredictable ways. Similarly, one's role in society and personal relationships will also change. In addition, the singularity will be based on the mutual interpenetration of human

biological systems on the one hand, and the technology that enhances their functioning on the other. The singularity involves *extending and enhancing* human competencies to produce unforeseen effects on the individual and society using technology that is integrated into the human mind and body. Thus the singularity will have a powerful impact on how leaders—and leadership itself—function and how people respond to their leaders. We also cannot assume that leaders will be those who possess the new abilities. To indicate the complexity of the social dynamics involved with the singularity, we can categorize ESIs into three main types: “Tweaked, Freaked, and Geeked.”

*The **Tweaked**s* abilities result from the integration of singularity technologies with individuals’ biological systems. Biofeedback and virtual reality will also help people achieve exceptional mental states. A select group will access longevity technologies (Scientists stop..., 2008) and leverage the advantages that healthily lived extra decades confer. The Tweaked represent the mainstream of ESIs, those who benefit from that broad front of technologies applied in as many ways as scientists can devise.

*The **Freaked*** are new creations: cyborgs or humans with significant mechanized parts; A.I.-guided robots, clones designed for single functions or operations, group minds operating through an open source mental system via embedded quantum- or protein-based chips, robots with animal or human brains, and even animals with human intelligence or humans with animal traits. The Freaked represent the true outliers of the singularity. As fantastic as these possibilities seem, all are based on technologies that are well along in development or are in the prototype stage.

*The **Geeked*** are un-enhanced individuals (henceforth referred to as “Norms”) who depend on external devices to achieve competitive advantage: access to super-computing; control of virtual worlds leveraged into “real-world” advantage; and gatekeepers who exercise control over energy, resources, and the technologies of crowd control and manipulation. The Geeked, of course, are already among us in the high tech industry. Indeed, many of the abilities we owe to technology would have been considered magical only decades ago. However, the

singularity-era Geeked will have far more fluid and powerful access to technology customized to produce specific advantageous effects. As the interface between human and technology becomes ever more seamless, the Geeked will come to embody the qualities of the devices themselves and perhaps become submerged in them, in effect becoming the Tweaked.

### *Evidence for the Singularity*

The singularity is not simply a conceit devised by scientists, inventors, and futurists unduly entranced with technology. It is, rather, supported by a continuous stream of scientific advances that already can extend human life, establish interfaces between biological and synthetic systems, improve brain function, integrate robotic elements into the human body, build implants that offer “superhuman” sight or hearing, clone individuals, create species hybrids (usually one trait from one species grafted to another) via gene-grafting, and develop ways to translate a person’s neuronal activity into their actual thoughts, among a host of other innovations. In a recent article, Vinge (2008), states that several main technologies, probably in combination, will lead to the singularity: “superhuman artificial intelligence (AI) in computers;... human-to-computer interfaces—that is we achieve intelligence amplification (IA);...by improving the neurological operation of our brains;...humanity, its networks, computers, and databases become sufficiently effective to be considered a superhuman being;... [and] the network of embedded microprocessors becomes sufficiently effective to be considered a superhuman being.” The accelerating development of a few key technologies—nanotechnology, super-computing, genetic engineering, and robotics—is propelling the singularity. Dark horse technologies that may also play a role include wave dynamics, virtual reality, biofeedback, holography, and cultivation of “higher” levels of consciousness. Public pressure is also contributing as interest grows in applying technology to improve quality of life, performance in many fields, and intelligence. Many also believe that humanity’s survival depends on its ability to transcend current human limitations, i.e., more sophisticated intelligences will discover solutions to a host of problems, from pollution to war.



### *Critique of the Singularity*

Ray Kurzweil is a leader in anticipating the singularity. His book *The Singularity is Coming* (2005) is the most complete and well-known exploration of the concept and its implications. Given Kurzweil's stellar achievements as inventor and thinker, it is worth critiquing his vision of the singularity as, in my opinion, it simplifies the social complexities the singularity will engender.

### **The Qualitative Critique**

Kurzweil invokes the concept of the "law of accelerating returns" (p. 36) to pronounce the inevitability of the singularity, a concept of historical progression that for Kurzweil plays a role analogous to that of the dialectic in Hegel. Citing numerous studies of evolutionary and technological development, Kurzweil establishes a logarithmic scale reaching back to the origins of the universe and projecting into the future to demonstrate how complexity and knowledge feed off themselves to produce an accelerating progressive curve, at least in regard to technology. No such claims are made for ethics, psychology, spirituality, and sociality, for example, although Kurzweil takes up some of these themes in his writings. When doing so, his point of view is emphatically positivist and "techutopian," reflected in his almost dismissive treatment of the dilemmas posed by the singularity.

Kurzweil argues that enhanced beings will retain a "reverence" for their "biological legacy" (30), and will desire only to serve us—perhaps as today an indulgent child or grandchild explains the basics of computing to her Luddite progenitors. Kurzweil believes we can "humanize" future machines; in part a claim that seems aimed at refuting those science-fiction scenarios in which machines turn against human beings in cold, pitiless assertion of their intrinsic and superior logic and power.

This view, however, circumvents several thousand years of reflection on the ambiguities of human behavior and the human psyche. Technology places vast potential within our grasp; so far, the evidence shows we abuse it as much as use it. Compared to where the human race stood in regard to its tools 300 years ago, we are already living in

an age of relative singularity, although a far milder version than the singularity that will prevail when machines are integrated into the body. Still, Kurzweil makes the fundamental mistake of the true believer in technological progress: while technology advances in power, speed, and efficiency, the ability of humankind to use technology wisely and well does not advance at all, but rather plunges ever more deeply into new dimensions of ethical, psychological, social, and spiritual ambiguity and turmoil. If the benefits increase, so too do the horrific applications; as technology creates wealth, so too increases the sheer volume of waste and levels of exploitation. The argument that ESIs will resolve such dilemmas using their greater intelligence begs the question. From fist to stick to knife to gun (Canada, 1995) and on to cannons, nuclear bombs, and high-tech weaponry, the singularity will not automatically resolve the fundamental tendencies towards sadism, self-destruction, greed, and power that exist side-by-side with the best of human inclinations. Like the few initial bacteria required to poison a pool of water, these forces carry with them an outsized set of consequences.

This is not the forum to decide the character of the human soul, and readers are qualified to make their own determination as to which elements of human nature will prevail over the next decades. Kurzweil is dead-on that we are on the verge of a technological revolution unlike any ever before, at least to our knowledge. However, the human part of the equation poses more uncertainties and complexities than even the technological, and it is that aspect that requires specially concentrated inquiry, if only to better prepare us for the “future shock” the singularity will occasion.

As previously stated, leadership is a critical element in determining relations among groups and individuals. In the future, leadership arrangements will shape the social dynamic between Norms and ESIs. Leadership is at the center of all questions of values, because a leader’s policies by their very nature represent assertions and determinations of ethical and legal positions. Leaders continually model and articulate the ethical stance, values, and world views of the groups they represent; they also play a major role in provoking and resolving conflict, which at root arises from contending ethical claims. Thus, leadership is the perfect lens through which to consider the singularity’s impact on the

future. The complexity of the future can be as intransigent as history and human nature. We cannot expect that an exponential increase in technological capacity, however transformative, will obliterate timeless human concerns and conflicts, nor that the new human-technology hybrids will be kind enough to revere their biological legacy as embodied in the unenhanced Norms.

### The Neuroscientific Critique

Neuroscientists challenge the very notion of the singularity by arguing that, no matter by how many powers of ten computers exceed the brain's calculating capacity, the brain relies upon other processes for which sheer operational speed is irrelevant. This criticism speaks to the heart of how the singularity is expected to occur. The dominant model of the singularity as first posited by Vinge and presented by Kurzweil has been based on an artificial intelligence (A.I.) model. At some point, the sheer calculative ability of computers will be so awesome—quintillions of operations per second—that, with proper modeling and the right software, they will indeed come to behave either more like brains (the traditional A.I. scenario) or like something other than brains and far more powerful. Sentience and self-replication, often depicted as key boundary conditions dividing robots from humans or mechanized calculators from true artificial intelligences, are not really the most important defining factors. More definitive is intentionality, the ability to frame and pursue objectives native to one's own internal operations. In any case, computers cannot even frame an original thought at this stage of their development, which one would expect now that IBM has pushed the calculations-per-second-rate just over the quadrillion mark. Nor is it simply a matter of neuroscientists being protective of their own discipline, reluctant to yield its mysteries to the sheer industrial power of computer science. They correctly point out that the more they learn about the brain, the more absurd seems the notion that it relies primarily on its ability to process bits and bytes. The bio-electrochemical processes that neuroscientists have revealed are astonishing in their complexity and, in some cases, can be said to resemble quantum behaviors, which would remove us several dimensions from the realm of sheer calculative aptitude.

Despite the integrity of this position, it does not, in fact, represent a roadblock to the singularity or the emergence of ESIs. Instead, the path to the singularity involves numerous technologies applied in myriad ways, with each application potentially reinforcing the effects of the other. As a result, the notion of the singularity has become more nuanced and complex. It is no longer simply a matter of producing the ultimate computer or transcending, in one leap, current human capabilities. Rather, small improvements can go a long way. Tens of millions of Americans a day alter their brain chemistry for medical purposes; how long before the same approach is used to enhance memory or increase intelligence? Other ways of enhancing brain function might include:

- stimulating brain areas with pharmaceuticals or electro-magnetic impulses to achieve improved cognitive performance.
- bypassing the electro-chemical interface between implanted chips and neurons and having them communicate via frequencies that replicate biochemical effects (McTaggart, 66 ff.).
- suppressing brain chemicals and functions whose purpose is to *inhibit* memory and other cognitive tasks, thus improving intelligence.
- implanting nanobots in the body that transmit digital commands to the nervous system.
- exploring the interface between neurons and quantum or protein-based chips, which likely have greater integrative potential than silicon chips.

With the advanced state of materials development today, the possibilities are endless. However, this monograph will not explore the scientific basis of the singularity, although it will be referenced. Let us note, though, that the debate between A.I.-based singularity proponents and neuroscientists no longer defines the issues. Even a few advances in one technology—i.e., the use of pharmaceuticals to enhance brain function—can by itself engender the singularity and with it a population of ESIs with the ability to transform society as well as the role played by its leaders and the leadership function.

### III. The 9-Phase Leadership Model

To address change of this magnitude and its impact on leadership, we must first establish a working context and vocabulary for leadership. Leadership means so many different things to so many different people under so many different circumstances that it will be meaningless as a referent unless a model, with terms of discourse, is set forth at the outset. The model should do more than provide background; it should be dynamic and point clearly to the nature of leadership in the singularity era.

The model proposed here avoids the common view of leadership as a collection of qualities that individuals possess or cultivate to varying degrees. Although the system I propose does define different leadership styles, they are not projections of the character of individuals or their studied responses to different situations. Instead, *styles of leadership are subordinate to, and functions of, the structural dynamics of a given type of society or organization.* A specific individual type emerges as leader according to the tasks and objectives that a certain type of group must fulfill in order to flourish. These tasks and objectives are determined by the level of complexity, mode of self-organization, and modes of apportioning and wielding power that take shape as a function of the group's systemic dynamics. Thus, the model proposed in this work addresses leadership in more universal, historical contexts than models based on personality type, situation, or organizational culture. The latter offer more restricted circumstances, social roles available to each stakeholder, stakes and objectives, individual options, and operative forces than does the stage on which history and society unfold.

#### 9-Phase Leadership Model

1. Instinctual
2. Magical
3. Distributive
4. Political
5. Imperial
6. Parliamentary
7. Managerial
8. Orchestral
9. Singularity

This leadership model is based on nine phases of social organization that reflect the general evolution of governance in human affairs; Phase

9 represents the futuristic singularity phase. The model has a number of *mutually reinforcing frameworks*:

1. It views socio-political development from an *evolutionary perspective*. It begins with an Instinctual Phase associated with primitive bands, and moves through the Magical, Distributive, Political, Imperial, Parliamentary, Managerial, and Orchestral phases and culminates with the Singularity phase. This is not a rigid template into which all political systems or processes of social change must fit, but it is true to the general movement of political history. It enables us to identify *core organizational and institutional dynamics, and the types of situations*, native to each phase.
2. Each phase produces a *leadership style* with its own strengths and weaknesses. Despite the system's evolutionary character, successful leaders in any period, including our own, can exemplify styles and use methods belonging to any phase. Instinctual leaders, such as Richard Branson or Donald Trump, can be as successful and sophisticated as any of their peers. While their approach to leadership depends primarily on Phase 1 assumptions, behaviors, and instincts, they may employ the approach of any phase at any given time in any situation. There are, however, differences in results if Instinctual types assert themselves in a Phase 1 society or in a Phase 7, and some pairs of phase-types are more in harmony with one another than others, i.e., it is easier to be an Instinctual than a Magical leader in a Managerial society.
3. Different *challenges or tasks* attach to each phase, as a function of both the complexity and teleological drives inherent in each. Every dynamic system contains within itself an element of intentionality that expresses its reason for being. Each phase thus poses different leadership challenges depending on the type of society and its functional objectives.
4. Each phase has its own *repertoire of strategies and tactics*. Thus, someone accustomed to operating from a Phase 7 (Managerial) perspective may find it critical, in a certain context, to apply

Phase 1, 2, or 8 tools. Some tools work better with some phases, and some can be applied against type, so to speak.

5. Each phase can be ascribed *core social attributes* for which various assessment instruments exist. Among such attributes, for example, are whether a society ranks high or low in regard to the role of context in communication, emphasis on closure, level of intrigue, acceptance of authority, etc. Once each phase's pattern is established, the model becomes a diagnostic and predictive instrument. It can, for example, tell what happens when Phase 1 tools are applied to a Phase 4 challenge. Another approach shows that, the greater the dissonance between the phase characterizing a leader and the phase of the context in which he is operating, the less likely is it that the leader, however skilled, will succeed.

Taken together, the 9 Phases offer a multi-faceted analytic and strategic system. The first eight Phases provide a context that clarifies the futurist Phase 9—leadership in the era of the singularity.

### ***Phases 1 through 8***

The first eight phases will be described by a key word, the type of society associated with each phase, the primary tasks faced by that phase's leaders, characteristics that distinguish leaders' relationships with their followers, personal characteristics that best serve leaders within that phase, and examples of historical figures or fictional characters who embody the qualities of that phase's leaders.

#### ***1. Instinctual Phase***

*Key word:* Energy. *Signature social milieu:* Early hominids, hunter-gatherer bands. *Leader's main tasks:* establishing boundaries and spatial contours of operations, deploying forces, generating language of power and authority. *Characteristics:* direct contact with followers; visceral, absolute loyalty between leader and followers, yet group quick to turn if leader falters. Reactive, hands-on, alert, vigilant, reflexive, and confrontational. May have many sophisticated skills but essence of style and authority lies with instinctual qualities. *Exemplars:* Richard Branson,

Donald Trump, Spartacus, gang leaders, Vic Mackie on *The Shield* (Ryan, 2002-2008), Bill Cutting in *Gangs of New York* (Scorsese, 2002).

## 2. Magical Phase

*Key word:* Inspiration. Shamanic tribal community, early priesthoods. Leader channels power from purportedly transcendent source. Leader's vision drives the organization; employs dramatic gestures, disdains accountability. (After all, the leader channels powers; it's not her fault if the world does not cooperate). Remote, mysterious, unflinching, and self-confident. Bends the world to his vision rather than reacting and adapting to what the world throws at him as Instinctual leaders do. History's "favorites": Napoleon, Alexander the Great, Joan of Arc, Crazy Horse, Abraham Lincoln. Also some of history's worst: Hitler, Hasan-i Sabbah, leader of the medieval Persian Assassins.

## 3. Distributional Phase

*Key Word:* Structure. Chieftain and confederacies; feudalism. Leader among leaders; the first leader whose identity is also managerial—emergence of leadership as a discipline. Very unstable, anxious about vulnerability—witness the high mortality of early Scottish kings. Apportions honors and rewards to jealous peers, the boyars and barons of history who resent yielding up their Instinctual Phase willfulness to Distributional authority. Magical is subordinate and assigned to a collaborative priesthood or consultants. Crafty, tactical, deceptive, suspicious, pragmatic; must keep machine running. Agamemnon, Stalin, Macbeth, Mario Puzo's Godfather, feudal lords, Ivan the Terrible.

## 4. Political Phase

*Key word:* Integration. City-state or maturing company; requires clarification of divisional responsibilities. Reorganization, rhetoric, networking, relationships, vision. Personal and creative gratification can outweigh financial rewards, idea-driven. Input from all stakeholders. Much less anxiety than Distributional Phase because Phase 4 leader has more innate legitimacy than Phase 3, but still treacherous, as politics of ancient Greece and Renaissance Italy show: internal party politics can



be vicious, and external powers with great resources tempt with bribes or promises of support. “Now we’re for real—real stakes, accountability, obligations.” Personal power diluted. Ability to leverage. Pericles, Bill Clinton, Machiavelli, Tip O’Neill, Fiorello LaGuardia.

### 5. Imperial Phase

*Key word:* Expansion. Empires are conglomerates, not melting pots. They grow by incorporating kingdoms, much as General Electric under Jack Welch grew by acquiring other companies. Merger mechanism can create unrest; borders highly vulnerable, integration difficult. Diversifying unwisely can spread resources too thin, and arrogance of power neglects nuts and bolts of maintenance. Constituent units often somewhat independent in local affairs, but must follow Imperial lead in matters pertaining to cohesion of whole, i.e., military, foreign affairs, taxation. Localism and regionalism percolate in shadow of throne. Common leadership delusion: that might of Empire negates need to balance contending forces. Over-concentration of power at the top. Inner circle often hotbed of intrigue; palace coups. The best Imperial leaders consolidate the Empire, putting the house in order and upgrading internally. Cyrus the Great, Augustus, Hadrian, Khubilai Khan, Bismarck, Jack Welch, Bill Gates.

### 6. Parliamentary Phase

*Key word:* Sustainability. Modern nation state. Leadership formally balanced among branches and agencies of government. Power wielded legalistically; requires familiarity with procedural labyrinth. Power and leadership function as complex patterns of exchange: negotiation, deal-making, compromise, favors. Actually serves as a sophisticated data-processing system for an aggressive mercantile economy. Leader must balance intricacies and subtleties of a deal-based system with prickly individuality of other power brokers and citizens. Theory-driven—Hobbes, Locke, Rousseau, Paine, Burke. System forgives weak leadership because rational balance of power means that others pick up slack when one falters. Morally driven reformers: Martin Luther King, Jr., Gandhi, Abraham Lincoln, Eleanor Roosevelt. (These are often *not* Phase 6 type leaders, but arise to correct Phase 6 abuses). Exemplars: Franklin D. Roosevelt, Lyndon Johnson, British Prime

Ministers. Nixon, skilled Phase 6 player, violated Phase 6 spirit with Phase 3 behaviors and was taken down.

### 7. Managerial Phase

*Key word:* Concentration. Tightly organized, relatively closed system with highly specified, quantifiable objectives. People reduced to cogs within the system; for leaders, small personal touches go a long way. Learning close-looped, task-oriented. Bureaucracy. Among Tops, Middles, and Bottoms bonds are primarily horizontal (middles with middles, etc.) (Oshry, 1992). Operations, functions, processes, procedures; people for the sake of numbers and output. Ethical dimension suppressed in favor of expediency (Jackall, 1988), but suppressed corruption can erupt and damage an organization. Constant upgrading of competencies. Vertical antagonisms suppressed and sublimated. Emphasis on position power. Collaboration for sake of financial scorecard. Exemplars: the Organization Man of the 1950s, most corporate leadership today, General Eisenhower in WWII, tendency of the European Union.

### 8. Orchestral Phase

*Key word:* Dissemination. Digital, post-modern. Still emerging in the present day. Many organizations strive toward it or have pretensions to having achieved it, but still nascent. The synthesizer, coordinator of energies. Anyone can claim power on their own personal reality screen. Expertise-driven, multiple options, obliqueness, everyone a peer. Boundary-dissolving, constant flux, each person travels light yet assumes they are the center. Leadership must justify itself, cannot rely on position. Transient bonds cultivated by players in synch with the rhythm of the network. Situational thinking. Low respect for authority, low accountability—efforts too dispersed, people too mobile. Smart, visionary, quick, slippery. Quick-forming, quick-dissolving alliances; gurus replace leaders, cultures replace organizations, links replace borders. Products themselves actually function as links that establish affinities and attachments. In groundless environment, knowledge is the surest ground. Creative, entrepreneurial. Google culture. Duke Ellington (hence, “Orchestral”) – guru among masters, leading with a

nod and a wave; spreads credit, rewards. The archetypal “road warrior” of U.S. business myth. Historically rare: Ellington, Tecumseh, Genghis Khan.

### 9. *The Singularity Phase*

*Key word:* Synchronization. A global, networked civilization with population of 8-14 billion; nation-states weakened in favor of regional alignments and murky global organizations. ESIs living side-by-side with Norms. Narcissism moves to both extremes in ESIs: visionary benevolence versus extreme self-absorption with own gifts, with subsequent impact on the character of leadership. ESIs rely overmuch on enhanced abilities in making decisions and have blind spots in those areas of performance not covered by those abilities. “Singularity intelligence” is an imprecise concept, often referring to very specific domains of cognitive activity. The *differential* between singularity-related abilities and regular or under-developed abilities in ESIs causes intense anxiety among ESIs. Many ESI leaders prove unreliable as they can only process very narrowly defined decisions. Leadership tends towards the technocratic, asocial, narrowly visionary. Who shall lead the disenfranchised? Will the disenfranchised among ESIs and Norms make common cause or compete with one another? Relationships based on awe at outsized talents may be marked by intimidation or uneasy emotional ties.

ESI leaders likely are confident, technologically networked, unemotional or erratically emotional. Norm leaders in Phase 9 may be suspicious, angry, confused. Successful Norm leaders, though, cultivate their own gifts and leverage them for tactical advantage; for instance, “If you can’t out-calculate them, out-intuit them.” Such Norms are eager to engage in intensive interaction with the Tweaked and seek access to Geeked-controlled technology. They also make sure they understand the abilities and technologies of the Freaked. Smart leaders on both sides advance collaborative initiatives. Business booms for consultants and trainers who assist bewildered leaders in understanding such issues as “What do Norms really want?” and “Running a Family Business with Your ESI Sibling.”

Norms will not be totally hapless in the face of the singularity and will be able to assert certain advantages over ESIs that give them a claim to leadership, including:

- An emotional life that provides the basis for interpersonal bonding.
- The ability to feel empathy, tolerance, and compassion.
- A spiritual life that, broadly defined, represents a response to inner experience outside ordinary perception and apprehension.
- A balanced psyche not reliant on out-of-scale skills.
- A sense of humor and humility.
- Self-worth not based on a single talent.
- The ability to cooperate and collaborate towards a collectively agreed upon end.
- Delight in the physical world.
- Consciousness shaped by awareness of suffering and death, which lends creative urgency and meaning to life,

Were we to design an ESI with these qualities, we would wonder at its singular emotional intelligence, and indeed, Norms are the animal kingdom's singularity. However, ESIs will possess some or all of these traits, so it is unclear what advantage will accrue to Norms due to these affective qualities. For both groups, however, good leadership will involve improving these traditional Norm strengths.

### ***The Phase 9 Environment***

*“To enslave an individual troubles your consciences...but to enslave a clone is no more troubling than owning the latest six-wheeler ford [sic], ethically. Because you cannot discern our differences, you believe we have none.” (Mitchell, 187)*

As pre-Singularity humans, we need to discard the assumption that we will always exert control or leadership over technology. The habits of leadership are central to our collective psychology, and the singularity will cause a dramatic shift in the underlying character of leadership. *At*

*no other time in human history has the locus of leadership shifted from the strictly human to beings with greater mental capacity than our own.* Our most deeply engrained attitudes towards power and leadership will be demolished because it is impossible to maintain a cultural concept when its experiential underpinnings erode, except by sheer force, which is only a temporary and usually disastrous solution.

In Phase 9, a new psycho-social space will emerge that embraces the aspirations, modes of thought and behavior, and values of both Norms and ESIs. Leaders will need to grasp what makes ESIs tick and the differences in motivation, response, and wants among the different classes of ESI. Leaders will be charged with managing the threat that ESIs' superior skills pose to Norms' careers and standing in society. Reducing natural inter-group tensions based on envy at shifts in status and wealth, etc. will be another key task, as will be establishing channels of communication and mutual stake-holding bonds between the two groups. The law—the organizing axis of any society—will be besieged by entirely new *types* of situations, the resolution of which promise to be daunting, considering that legal issues posed by eCommerce and bio-engineering still confound society today. Issues of punishment, guardianship, ownership, and citizenship will arise, not just because the ESIs' talents engender new types of situations, but also because ESIs will owe their origins and identities in part to (often patented) human interventions and even—in the case of self-replicating and self-improving machines—to interventions of technology, including the ongoing improvement of their own systems by the technology embedded in their bodies.

As technology interfaces more and more intimately with biology, the ESI population will grow and its social position will become both more prominent and ambiguous. If traditional human assumptions about hierarchy make less sense as ESIs upset prior notions of merit, achievement, and individuality, then leadership concepts based on hierarchy, i.e., virtually all of them, will lose much of their validity and ability to drive behavior. New types of arrangements will rush in to fill the vacuum.

It is evident that Phase 9 leadership will overturn many timeless verities, and not simply because of a culture clash between Norms and ESIs. Among Norms will be people and groups with different levels of power, access to technology, wealth, status, and intention, while ESIs will range from human beings with one or two extraordinary gifts to completely artificial beings imbued with some semblance of intelligence and/or self-awareness. No single dimension of interaction can adequately describe the new resulting relationships. A host of questions arise. What type of leaders will Phase 9 produce? How can Norms assume leadership over ESIs? Has the genie been let out of the bottle, dooming Norms to increasing irrelevance? Are the pessimistic, dystopian visions the most likely to come to fruition? What sort of leadership will most capably guide society through these Phase 9 transitions?

### ***Leadership Constants in Phase 9***

The leadership constants identified earlier in this paper provide one useful set of variables by which to anticipate the quality and character of Phase 9 leadership.

**1. *Higher Status.*** Many ESIs, especially the Freaked, will start out pretty much as servants or curiosities, as will simulacra such as holographic entities, cyborgs, and clones. The Tweaked, on the contrary, will leverage power from the beginning. Conflicts will flare in regard to recognition and compensation: do ESIs or their designers, owners, and/or handlers receive credit and rewards for a job well done? What fate lies in store for ESIs rendered obsolete by improved technology? Norms will not necessarily be loyal to their “own”; many may align with ESIs, and Norm leaders who can work well with ESIs will flourish. Resentments flare: “I lost the promotion to one of those genetic freaks,” or “I lost out to a Norm because the bosses were afraid of a backlash.” Inventors of ESIs will be recognized much as pioneers of computer technology are today, but an extra level of status will be in play: the inventors may also potentially be *leaders* of the ESIs they have created, or will retain exclusive rights to the technology needed to produce or control ESIs. The ethics and legality of this control has the potential to become a flash-point that leads to social conflict and the emergence

of divisive social movements. These inventors may be Norms or ESIs themselves. **Summary:** *High conflict over new players' claim to status. ESIs and their creators disrupt traditional hierarchies.*

**2. Resource Ownership.** Systems-savvy ESIs increasingly assert control not only over systems but content. After all, they will actually be *components* of the very systems that gave them birth and hence are more strategically placed than Norms to assert power over and through those systems. When can an ESI own property? When does a cyborg receive a paycheck? The ESIs' level of independence determines their claims to legal standing. "Old Order" members of the Norm economic elite will feel threatened. Resource ownership is always a major factor in determining who becomes a leader. ESIs' intimate relationship to the systems that organize and produce wealth means an inevitable shift in their favor. The eruption of new outsized skills proves highly disruptive, with overnight obsolescence and sharp reversals of fortune, that is, major shifts in resource ownership. **Summary:** *Resources shift towards ESIs; Norms feel threatened. ESIs in favored relationship to tech systems. Volatility. Conflict over compensation and reward: who gets credit for ESI innovations, ESIs or their creators?*

**3. Decision Impact.** The first time an ESI asserts decision-making powers will mark a watershed in human history and a sea change in the nature of leadership. Even the Tweaked, for all their human qualities, will make decisions based on different perspectives and assumptions from those held by Norms. Geeked leaders who control singularity technologies will eventually yield leadership to the Tweaked and Freaked as the latter groups gain confidence and independence. The leadership initiative will shift to ESIs as their decisions, based on superior cognitive capacities, prove impossible to dismiss or resist. They will often blunder because singularity in no way implies omniscience or infallibility. In either case, however, the impact of ESI decision making will be heightened due to ESIs' ability to factor a greater number of variables into their calculations and strategic planning. Because these decisions impact society more than those of non-leaders, power will shift towards ESIs, whose decisions will naturally reflect the biases inherent in their enhanced abilities. **Summary:** *Major power shifts;*

*ESIs have better decision-making tools, yet can be one-dimensional. High conflict potential.*

**4. Symbols and Rituals.** Tales of ESIs' abnormality or great achievements are spun into legends and myths that shape public perception of ESIs' leadership qualities. Within the media, a battle rages over the symbology and mythology of ESIs, the outcome influencing how well ESIs and Norms understand one another. What will ESIs worship? How will they interpret their origins? As ESIs outstrip their Norm creators and assume leadership over them, will their psyches strike off in preternatural directions, for who before has ever ruled over their own creators? Sex is no longer the only generative force; that honor will be shared by the technologies that create the singularity. The true unseen powers are not *higher* powers per se, but the source of ESIs' gifts and the networked links that connect them to that source. Any community's depiction of the universe's ultimate power, be it scientific, mythic, or religious, serves as mandate and model for specific functions, structures, and styles of leadership. Given ESIs' origins in research labs, they may well envision this power as hyper-rational, perhaps ironic, cruel, and absurdist rather than benevolent and generative or demanding and punitive, two common Norm models. Power will be lost and gained more quickly and easily than ever before, and those who can retain and cultivate it will stand as exemplars of a certain type of highly valued wisdom. **Summary:** *Rich new source of symbolism will influence how mandates for leadership are shaped, perceived, and applied. New wisdom traditions.*

**5. Whoever effects change is by definition a leader.** Discussions of leadership usually assume a given individual's leadership position, i.e., "Mary Johnson knew the Board's expectations when she became Chair...." However, except in hereditary situations, leaders are made—or make themselves—and are not born as leaders. No one is a "born leader," although some, like Napoleon or Alexander, demonstrated a drive to leadership at an early age. The former was a member of the lower nobility in a marginal part of Europe, while the latter's birth was attended by expectations but no guarantees; both proved extraordinary leaders. Genghis Khan was a lowly outcast from the lowliest tribe of the steppes throughout his entire childhood and early manhood. However



one assesses their personalities, upbringing, and achievements, all three rank at the summit of leadership because all three literally, utterly, and irrevocably changed the world by force of their own personalities and vision. And at any level of organization or community, fomenting change marks one as a leader, whatever one's nominal position. After all, Tecumseh was not officially a Shawnee chief. In the era of the singularity, change will occur with ESIs at the heart of the action because ESIs *are* the defining change of the era. **Summary:** *ESIs represent change, sui generis; leadership will naturally fall to them as they assume the role of society's most dynamic change agents.*

**6. Greater Ability to Organize Society.** This is the crux of power and also a focus of much futurist thought. Technocracy has long been depicted as uniform and oppressive, with social control the primary aim. In broadest terms, ESIs will influence social organization to reflect and favor the expression of their outsized talents. This shift *could* imply a commitment to creativity and innovation, with society organized to favor artists, visionaries, scientists, and inventors rather than profit takers. Or it could result in 1984-like scenarios due to the power endowed by invasive, body- and psyche-penetrating technologies. ESIs will also influence how society distributes rewards. For instance, they may be better at using ultra-high-tech weaponry. They may even *be* ultra-high-tech weapons! Either case will effect a broad power shift and hence influence institutional forms. Institutional hierarchies will realign to suit the relationships forged among ESIs; highly unsettling to Norms, especially those in leadership positions. The singularity not only challenges traditional Norm leadership, but undermines the institutional bases from which those roles emerged. **Summary:** *Inevitable shifts in power and philosophy regarding society's core purpose and its mode of organizing itself. Societies always recognize outsized talents; much will depend on whether ESIs as a class are unified. Potential for creative renaissance. ESI facility with technology gives them an inherent advantage.*

**7. Defining Social Space.** Leadership's interface with society defines the geometry of "social space," with function, persona, psychology, relationships, class, and range of activity serving as the social equivalents of vertices, faces, edges, proximity, area, and volume. Phase 9 continues

the distribution of power throughout the system that marks Phase 8, although power centers will be subject to strong centrifugal tendencies. Rather than identifying with a specific locale (headquarters, capital city), ESIs experience the network that links them to the source of their powers as the locus of leadership. Important exceptions, though, are the laboratories and production centers of the singularity technology, which become the core of new urban and suburban communities populated by ESIs and forward-thinking Norms. These may serve as incubators for new leaders and new types of organizations. Leadership will be highly mobile, a force that individuals “intercept” in their journeys through the digitized networks that replace traditional social space. **Summary:** *Decentralized society with cyber-space and networks as dominant social spaces. Mantle of leadership assumed and discarded according to where one happens to be in the network. New types of communities become dynamic change agents and power centers.*

**8. Embody Core Assumptions, etc.** Leaders are role models who exemplify what a society stands for. The emergence of ESIs ushers in new standards by which leaders are judged and selected. As ESIs become more prominent, society comes to see itself as a place where unforeseen dramatic events occur, a place of spectacles and daily miracles. At the same time, it values the older ideal of the balanced individual. ESIs, with their outsized talents, feel the diminishment of other aspects of themselves ever more intensely. Norms who possess special gifts through natural means or ESIs with balanced psychological profiles, may come to embody ideal types. But in selecting leaders, there will always be a pull between favoring those with startling singular abilities versus individuals with balanced, organized psyches, as well as tension between a preference for rapid progress versus the reassurance of social predictability. **Summary:** *ESIs create new leadership models. The age of miracles, spectacles, and dramatic momentum shifts. Push-pull between balance and talented as salient leadership quality.*

**9. Ability to Mobilize Resources and Population to own Ends.** With the most thorough, far-reaching, efficient networks in history, ESI leaders can mobilize unprecedented resources very rapidly. One highly regarded leadership skill will be the ability to captain a project without disturbing social and economic equilibrium. Even with dispersed

leadership, the efficiency of resource mobilization will be such that changing direction might be akin to using hypersensitive power-steering to turn an ocean liner. Will the integrated systems that ESIs navigate contain sufficient boundaries and firewalls to prevent unintended runaway consequences? A light touch will produce immense shifts in resources, and controlling this touch will challenge leaders of all types (a problem faced in 1987 during the October stock market plunge when trading programs spun into an accelerating downward spiral). Improved efficiency in solving big problems quickly is counteracted by new threats inherent in rapid mobilization and monopolization; these enhanced efficiencies in deployment require a rethinking of tactics and strategy. **Summary:** *Extraordinary ability to mobilize resources, with new dangers, such as less balance, more volatility, greater monopolization. Revitalized problem-solving capabilities; “light touch” highly valued.*

**10. Incurring Wrath.** Constituencies that turn savagely on their leaders for real or perceived betrayals or failures are a staple of history. The stability of any system depends in part on sublimating or channeling that wrath—sometimes justified, sometimes irrational—into constructive or relatively harmless activities. The anger of unemployed workers towards machinery that displaced them was part of the social landscape in Europe even before the Industrial Revolution. When the new “machinery” is now also the new *boss*, with a face and personality to go with machine-like power and efficiency, resentment can easily turn to wrath. Just as industrial modernism led to fundamentalist reactions in nations like Iran, Cambodia, Afghanistan, and even the United States, what we might call Phase 9’s “hyper-post-modernism” has a tremendous potential to increase feelings of dislocation and class anger. The singularity adds a deeply unsettling element to the social dynamics of the Phase 9 era, and not just for Norms. Low-status ESIs—possibly cyborgs, clones, highly specialized Tweakeds designed for one task, or the obsolete—will direct their wrath towards both Norm and ESI leaders who, in their minds, failed them. **Summary:** *Greater rage among Norms and obsolete ESIs at leaders, whether privileged humans or the latest in automation. Fundamentalist and nihilist responses to new dislocations.*

## **IV. The Singularity's Impact on Leadership: Preparation and Training**

Each of the nine phases describes the leadership traits, qualities, and strategies developed to meet the demands and exigencies that distinguish the organizational structure and complexity of that phase. Thus there is an inherent resonance between the society or group representing each phase and the phase-characteristics of the leaders that it spawns. Yet leaders whose qualities belong to any of the other phases will of course emerge in any phase society or group due to several reasons: not every group within a society reflects that society's dominant governance and organizational mode; every society comprises "legacy" elements of previous phases and innovative elements reflecting future phases; the temper of the times may demand "out-of-phase" leadership; and many leaders possess a range of skills in which the dominant, "out-of-phase" skill may be complemented by others more adapted to the dominant social phase.

Thus, while each period of history can be described in terms of its dominant phase, leaders who exemplify *any* of the phases can emerge at any time in different contexts and in response to specific circumstances. Techniques from any phase may be applied in any environment (although the "meta-strategy" should align with the type of situation being addressed). Within civilizations broadly dominated by one type of governance—managerial or imperial, for example—many situations arise that exemplify other phases, whether in response to exceptional situations, within smaller institutional units, as a reflection of the influence of an exceptional individual, etc. Thus the phases express the full spectrum of a society's leadership possibilities as well as expressing a history-based evolutionary sequence. We can anticipate how Phase 9 leadership will evolve by examining how the qualities and situational dynamics of each of the other phases will be affected by the Singularity Era.

### ***Phase 1: Instinctual – Loyalty, functionality, guts***

The Instinctual Phase and the singularity are by nature out of synch with one another. The former relies on interpersonal loyalty and a visceral connection between leaders and followers as well as the

leaders' "gut instincts." Meanwhile, the whole point of the singularity is functionality, true of technology in general. It is also, by definition, "counter-visceral": when machines—even nanobots the size of molecules—replace bio-chemistry, they replace the activities of the body's viscera. The singularity occurs because the processing speed of the machine, combined with the ability to integrate with biological systems, enables it to replace visceral biological operations with mechanical ones. This is true for nanobots facilitating cell function, super-computers calculating at peta-hertz speeds, tweaked genes resulting in great intellect or strength, longevity formulas based on artificially induced hyper-efficient biological activity, or implants granting microscopic vision.

Thus the Instinctual element that has served leadership since the beginning of human society—indeed, among other mammals as well—will be replaced in part by technology that is by nature functional, unemotional, and impersonal. This raises a crucial question that has been addressed previously in the section critiquing the singularity: *once ESIs can process information hundreds of times faster than the human brain, as Kurzweil envisions, will intuition and instinct be obsolete, or do they provide qualitative benefits that no amount of processing power can ever replace?* It is possible that the answer is that intuition will be obsolete without contradicting the neuroscientists' overall argument regarding the complexity of the brain. Nor is the question of intuition strictly academic, as the answer will help determine what is being lost and gained as the singularity establishes a hold over human nature. It is also a central psychological and political, as well as philosophical, question. If aspects of qualitative cognition are made superfluous by data crunching at unearthly speeds, it will naturally call into question the values, thoughts, and achievements for which those intuitional qualities were noted.

The "natural" leaders to whom others instinctively turn still exert their fascination and authority. Even in our bureaucratic, managerial, and technological civilization, charisma and instinct are often linchpins of a successful career. People naturally want the Instinctual leader's approval, as if the latter can anoint followers with the primordial energy whose excess is their source of power.

Yet the Instinctual is, after all, Phase 1, and it has been diluted throughout history by the exercise of law, custom, ritual, suppression, sublimation, and technology. In theory, the chain of command, be it military, political, or organizational, is not supposed to depend on personal responses to a leader, despite the fact that, in practice, the Instinctual element is a powerful leadership tool.

The singularity places the Instinctual under siege because technology will invade its primeval lair, the body. Cold functionality replaces instinct. As instinctual authority declines, the leader/follower relationship fades in importance. When leadership qualities and performance derive from technology, then it is technology we respect, not the individual. The instinct that guided the Phase 1 leader will be superseded by the ESIs' awesome powers of calculation, risk analysis, and physicality.

With the loss of the camaraderie and visceral bonds that unite leaders and followers, the leadership function itself will suffer a blow to its prestige and authority, and group cohesion will exhibit unfamiliar characteristics. One never knows when an ESI leader will be superseded by a superior version. Upgrades in technology will threaten the stability of command. A leader's knowledge could be uploaded into new leaders, and leaders may seem as disposable as computers. One's talents will be ascribed to technology rather than the innately human, further reinforcing the trend away from instinct. There is a big difference between soldiers appreciating a sergeant's guidance under fire as a function of the latter's experience, duty, and protective mandate versus crediting the sergeant's wisdom to his corneal implants (Sofge, 2008), which allowed him to assess incoming threats at computer speed.

Phase 1 leadership will be affected by the singularity in several ways:

- Loss of respect for leadership in general; whoever has the installed goods tends to be the leader, and thus leadership is not anything special.
- Democratization of leadership as ESI technology spreads throughout the population.
- Democratization will not necessarily mean a transfer of power downwards so much as laterally to ESIs, whose rise will cause factionalism in society and organizations.

- Growing instability of organizations when the traditional meritocratic paths to promotion are short-circuited as ESIs win promotion and command; reduced loyalty to leaders and organizations.

Counter-tendencies exist to every dominant trend. Backlash, for example, is a major trigger for counter-tendencies, which in this case, may take a number of forms:

- Nostalgia for instinctual leaders that results in self-conscious and exaggerated versions of instinctual behavior. Following one's "gut feelings" becomes a status symbol, but often without a "gut sense" of what that really entails.
- New methods for cultivating instinct will flourish *if* instinct is shown or believed to supply leadership qualities that ESIs tend to lack.
- Rarity raises value, so when an instinctual leader does emerge, her influence may spread like wildfire as long-displaced atavistic impulses resonate with this new instinctual expression.

Another important trend involves the well-vetted theory that mechanization *de-integrates* instinct from the psyche. In this view, technology's numbing, dehumanizing qualities lead to savage outbursts of suppressed instinct in the form of extended acts of mass violence, such as genocide. The apparent contradiction that technology releases instinct arises from the dual notion of "instinct." The instinctual quality in leadership does not exist in a vacuum—it operates in social and psychological contexts that can be healthy or not. The id, Freud's term for that unconscious collection of innate drives, can be integrated into a healthy ego; indeed, that integration is one of the keys to a healthy psyche. The Instinctual leader *relies* on her or his instinct but does not necessarily descend into its basest expression, i.e., mass savagery. It is not the "animal self" that commits such crimes, but a disordered version of humanity in which the superego—the internalized rule-imposing authority of the psyche—overrides a vulnerable ego and harnesses the power of the id for its own purposes. In any case, a surge in the mechanization of human life predictably leads to periodic savage outbursts during which leaders who appeal to the lowest collective

instincts prevail, a danger that preparation for the singularity could help avoid.

### *Phase 1 Training*

The instinctual is inherently humanizing when weighed against the effects of technology. That is, the same force (instinct) that makes us similar to animals seems positively human when set beside a robot or, indeed, any machine. It is not that people living by instinct are more tolerant or compassionate than others. It is rather that the instinctual—identified with “wildness” or “unconscious impulses”—is the soil from which our deepest feelings grow. These can be refined into intellectual, aesthetic, ethical, or emotional expression, but if we are cut off from that primeval self, our sensibilities dry up much as a plant in arid soil.

The instinctual element in leadership is not the same as the instinct that a soldier or martial artist is conditioned to exercise, although they may overlap. The latter refers to instant reactions for which the fighter is trained by focus and repetition. It is in fact learned behavior intended to *mimic* the speed and naturalness of instinctive behavior. It may lend itself to the exercise of true instinctual qualities by clearing the mind of the calculation and fear that interfere with instinct, but in and of itself, it does not assure the presence of that instinctual quality associated with Phase 1 leadership or its repertoire of tools.

Training to develop instinctual leadership skills will be increasingly important as the singularity approaches, even if such training seems oxymoronic. How does one train for the most vitalistic, naturalistic leadership quality of all? Some approaches might include training that

1. Focuses on the individual's experience of her or his own body.
2. Overcomes self-censoring tendencies that get in the way of instinctual behaviors.
3. Dispenses with technology at first and introduces it gradually as training progresses.
4. Transmutes self-analysis into controlled self-abandonment.
5. Seems radical by the usual standards of managerial or military training.



6. Gives leaders access to that inner reserve of resources usually activated only in extremity.

Working from the outside in, trainees learn the gestural language of command and inspiration as well as that of receptiveness and submission in others. The physical movements of animals should be studied as dramatic cues, as well as those of great actors and historical figures. These movements can be broken down and analyzed so the trainee understands *why* they work, the gut impact of the message transmitted by the right gesture. This is a behavioral approach that appropriates the principle of mimicry; the rationale is that individuals activate and internalize the instinctual qualities of leadership by mimicking behaviors already coded within the mammalian or more primitive human parts of the brain.

Many Phase 1 leaders have an inner advisory voice, and the ability to hear that voice can be taught. The voice belongs to the unconscious mind, which often puts the pieces of a situation together before the conscious, rational mind can. According to Professor Gerard Hodgkinson (2008), “intuition is the result of the way our brains store, process and retrieve information on a subconscious level.” The key to “gut” feelings, which is very much a Phase 1 characteristic, is not just the speed at which data is taken in and processed, but the ability to draw accurate conclusions from this process, which validates the leader’s judgment and adds to the Instinctual leader’s mystique. This is most germane to ESIs and Norms hoping to achieve ESI-like abilities. One of the promises of the convergence of nanotechnology and supercomputing is the accelerated rate at which the mind processes data, which could improve gut responses and thus give a leader Instinctual credibility. Thus, despite an intrinsic contradiction between Phase 1 and the singularity, the latter could actually produce a more effective exercise of intuition.

Eventually, Instinctual leaders develop a sense of where their power stems from within their own bodies. It could be the gut, the heart, or a more generalized feeling on the skin or in the brain. People can learn to identify that kinesthetic location and use it as a trigger when they need to project a Phase 1 persona. Visualizations are another important tool for activating instinctual leadership elements that—as other mammals

demonstrate—are hard-wired into the nervous system. Integrating visualization with kinesthetic awareness of instinctual energies can be transformative even for those whose leadership styles lie in another phase. Training for instinctual qualities should be viewed less as an attempt to identify Phase 1 leaders than a means of expanding the leadership repertoire for leaders of any type so they can exercise authority using this crucial energy.

### ***Phase 2: Magical – absolutist, irrational, disruptive***

Magical leadership is almost obsolete in modern organizations. It is a later phase than the Instinctual because it presumes awareness of external meta-forces for which the Instinctual has no particular regard. Instinctual leaders are generators of their own drama, and the force they wield comes from within and is transmitted to their followers by direct contact. The Magical leader believes in a prime mover behind the scenes, a force or gift often claimed as otherworldly, with its sources remote. The Magical leader channels this force, and in many respects, it is the force, rather than the person animated by it, that inspires confidence in followers. Joan of Arc had no claim to leadership based on her life or position to that point; her role sprang forth from the force that she and her contemporaries attributed to divine guidance.

That doesn't really fly in today's organizations. General Patton may have had his own personal mystical beliefs about previous lives as warrior and leader, which may have reinforced his own self-confidence. That was not, however, the reason Eisenhower had faith in him. Many people may have similar private beliefs that influence their abilities or self-esteem, but they are rarely publicized and, if they are, will more likely undermine than propel a career. However, throughout the world, the Magical repertoire still is wielded to great effect by religious and political leaders. Whether fringe cults, mainstream religions, or political leaders tapping into humanity's primitive magical thinking, the persuasive power of those who claim to be in touch with "higher powers" is still potent.

ESIs will demonstrate qualities that transcend what was previously considered human. This could lead to a revival of the Magical in the Singularity Era as ESIs attract devotion and loyalty based on the

seemingly magical quality of their gifts, especially among populations unexposed to the relevant technology. Not only Norms will be susceptible to such leaders. ESIs represent a diverse group of types and abilities. Those talented in particularly appealing ways may win the devotion of other ESIs.

The return of Phase 2 to prominence could further enflame the global system because the Magical Phase is inherently irrational. Perhaps the decline of the Instinctual will leave a vacuum in terms of loyalty and inspiration that the Magical fills. The Magical is inspiring, but its hold can be shaky, dependent upon a source often only temporarily identified with the individual who channels it. Thus it is inherently less stable than the Instinctual.

In the era of the singularity, however, an unprecedented wild card exists in the Phase 2 equation: the *sources* of this magical power will be very much of this earth—scientists, engineers, government agencies, corporations, etc. It is not only the leader endowed with “magical” ESI powers whose leadership will take on a Magical aspect, *but the managers and technocrats who achieve magical status by virtue of their ability to dispense this power*. The figure behind the curtain really is a wizard. The organizations that control the sources of civilization’s energy are among the world’s most powerful: oil companies, nuclear powers, lumber and mining concerns, agribusiness, etc. These will be joined by the organizations that control the singularity. And because the latter produce very sophisticated products that bestow significant competitive advantage on individuals, organizations, and nations, they will be imbued with a Phase 2 aura they will probably exploit.

### *Phase 2 Training*

Training for Phase 2 should probably focus more on how to *cope* with Phase 2 leaders than how to become one. The Magical can be liberating when a leader’s vision inspires people to achieve more than they had thought possible, especially when combined with a brilliant mind and superb skills (Napoleon, Crazy Horse, Alexander), but it can just as easily be used to manipulate people into the worst excesses (Hitler, the Taliban). Phase 2 training’s goal is not to turn participants into Magical leaders, which is contrary to the needs and wishes of

most organizations. Rather, it is to develop strategies for confronting, engaging, and maneuvering Phase 2 leaders and their followers, although an intelligence agency may want to train people as *faux* Magical leaders for a given purpose, in which case ESIs will be invaluable, for they can be programmed, developed, or tweaked to produce the precise type of skill that fits the profile of a Magical leader for a particular region or community.

Both potentials can be crucial in the Middle East and will be more so world wide as the rise of evangelical religions adds an element of irrationality and religious enthusiasm to the political mix. Applying the mind-sets of a Managerial or Parliamentary Phase nation to the problems of nations still at the Distributional or Political Phase is difficult enough. However, when commanders and policy makers fail to recognize the special qualities of the Magical Phase, which can be strong even in societies with a political super-structure, they court catastrophe, especially as Phase 2 leaders are likely to gain influence in the Singularity Era.

Awareness comes first in this case. It is difficult for people in industrialized nations to recognize the impact of Magical leadership or even to admit that it *could* be influential. This holds even when a society is well aware that it contains fanatics and cults, because we *assume* that beyond Magical leaders' immediate circles, their influence dissipates. In fact, Magical leaders can galvanize enormous cultural energies. And the Magical is often disguised by the political superstructure in which it is embedded. We tend to balk at publicly assigning a primitive-sounding descriptor to a behavior that others consider a vital part of their religion. Nonetheless, whether Islam, Judaism, Christianity, Hinduism, the passions of an animist society, or those gifted and basically secular Phase 2 leaders such as Napoleon and Alexander, the Magical generates a specific type of problem that no other phase does: it tends to be overlooked, and this lack of recognition leads to severe strategic and tactical mistakes.

A second step is identifying and teaching Phase 2's distinctive qualities and the specific problems they pose. For instance, negotiation is likely to be less successful with Magical enemies because their loyalty

to their “guiding force” supersedes loyalty to the protocols and laws that govern contracts, agreements, and treaties. Unlike the Instinctual, for whom peaceful circumstances can be as gratifying to the exercise of their power as conflict is, the Magical tend to see things in absolute terms, with ultimate victory pre-ordained. The Axis powers in World War II were driven in large part by Phase 2 impulses: Hitler’s hold over the German people, his virtually possessed states when delivering a speech and the ersatz mysticism of Nazi ideology; the Japanese devotion to the Emperor and their warrior code; and even Mussolini’s aping and invoking Rome’s legendary glory. Perhaps this accounted for the savagery of the war, from the try-outs in Ethiopia and Spain to the Japanese attacks on China and treatment of POWs; the Holocaust; and Hitler’s plan to enslave Poland, wipe out the populations of Russia’s major cities, etc. (Shirer, 1960).

A third step is developing hands-on strategies and tactics that prepare leaders to confront Phase 2 elements, be it in war, diplomacy, intelligence, or business. In dealing with Phase 2 leaders, it is critical to establish the magical credentials of the group one represents (whether or not one views it as magical). The individual operative does not need that magical quality, but must show that whomever they represent is motivated by a core belief system as worthy of respect as the magical leader’s own. That is the only counterforce that can gain a Phase 2 leader’s attention; even superior fire power is inferior in that regard, as many Phase 2 leaders are happy to launch their followers, whatever the odds, against those they consider infidels, heretics, non-believers, etc. The language of military threat, political expediency, and horse trading in general may win a temporary reprieve or truce, but it will rarely cause Phase 2 leaders to modify their positions. Only when confronted by a magical force of apparent equal quality and/or power will they grant their respect. Training should provide one’s own leaders, representatives, or agents with the language and content to match the Phase 2 leader’s ideational and affective potency.

Further training involves the *how-to* of establishing one’s own credentials as a representative of a powerful belief system: the gestures, rituals, and key phrases most likely to influence Phase 2 leaders. For example, an Instinctual leader’s gestures will be read as disrespectful

and aggressive if aimed at a Magical leader, yet one also wants to avoid any intimation of submission or lesser authority. Certain gestural and verbal cues have a virtually Pavlovian impact on an auditor's subconscious responses, so the training can be very specific. Thus, when starting off negotiations with a Magical figure, it is important to listen to and acknowledge their aims. Save the analysis and the counter offers for later. Unlike with the Instinctual leader, respect is not gained by fanning one's own feathers or head butting, but by establishing an equality of one's inner core while acknowledging the power of a Magical leader's drive.

In the era of the singularity, this raises fascinating possibilities. If the Phase 2 leader has gained ascendancy using singularity technology, or is an ESI himself, then he can be countered by confronting him and his followers with an ESI of equal, greater, or contrasting powers. Also, revealing the technological basis of an ESI Magical leader will tend to undermine her power in the eyes of her followers. Even if the leader is a Norm, the fact that her powers can possibly be transcended by an ESI will tend to undermine her legitimacy. Thus, even though the singularity will tend to encourage Phase 2 leadership, it will provide antidotes as well.

Suicide bombers and civilian casualties are part of the Phase 2 environment; civilians mean nothing to the Magical leader or his followers because the former are outside the magic circle of true believers. The medieval Persian Assassins' missions were generally suicidal in nature, as were the Kamikaze. and of course, the terrorist bombers of today's world.

It is crucial that one's own operatives are steeped in a Magical-oriented culture's deepest impulses, for that is where Phase 2 is grounded, just as Phase 1 leaders' foundations lie within their individual primitive and mammalian hard-wiring. Ham-fisted attempts to "win hearts and minds" are doomed to failure because Magical leaders are at one with, and fluent in, all the usages of their own world; one cannot win on their psycho-cultural turf. Coping with them requires an entirely new repertoire of thinking, intuition, communication, and policy. Sir Richard Burton, a leader of sorts who flew solo as a British player

in the 19th century's "Great Game," is a model of how to enter an environment rife with Phase 2 impulses and behaviors. He submerged himself completely in the culture and language of the entire region, and was also a pioneering anthropologist as well. It is no accident that many of the great British undercover figures who flourished in such environments—T.E. Lawrence, Peter Fleming, Gertrude Bell—were brilliant, learned people. Dealing successfully with Phase 2 leaders and the societies that nurture them is extremely demanding, especially in intelligence contexts. The United States, for example, has often dealt clumsily with Phase 2 leaders, in large part because our society has trouble taking the magical seriously as a political force; we assume it is relegated to the fringes or is the last resort of the inept. This approach has to change, and I would guess that we have barely gotten our feet wet in that regard.

Another key training goal for policy makers is learning to cope with situations in which there are many Phase 2 leaders, as in the Middle East. One approach arises from the recognition that the Magical becomes "bewitched, bothered, and bewildered" when lured from its roots. Alexander's hold over his men finally loosened enough for them to get him to turn around when he planned to plunge further into India and perhaps to the Pacific, well beyond even the shred of familiarity that the lands adjacent to the Persian Empire (northern India) could claim. Joan of Arc was thrown to the fire once her task was accomplished and she was isolated from the forces that made her a leader. The Shining Path in Peru declined steeply once their leader was captured and isolated. This solution, however, cannot work when an entire society follows a multitude of Phase 2 leaders. One cannot violate the sanctity of clerics even if their policies are unpopular. One can, however, engage in subtle dialogue to separate clerics from one another, but the tendency to address the *political* only results in untrustworthy temporary alliances.

Detaching one Magical leader from another can be achieved by establishing a connection on the Magical level. The political alone rarely outweighs the generalized magical qualities in a culture and often shrinks in value when measured against Phase 2 leadership. However, an alternative magical potency belonging to another culture

can have sufficient force to separate Magical leaders linked to one another by a common tradition (such as Islam or the sanctity of an ancient common enmity). Tecumseh, the great Shawnee leader, used his qualities as a Phase 2 leader to unite many politically disconnected and even hostile tribes in an alliance with the British during the War of 1812. His brother, Tenskwatawa, known as “The Prophet,” reinforced the magical quality of Tecumseh’s leadership, albeit rather crudely. To drive a useful wedge between magical leaders, one requires a strong dose of one’s own magical authority. If none comes to mind, then it has to be developed; this too can be addressed in training leaders to deal with Phase 2 situations. (However, initiatives such as the misguided evangelizing of Muslims in Iraq by U.S. military personnel [Leopold, 2008] is the antithesis of this approach, which is akin to the ancient practice of victors dragging the statues of the losers’ gods out of the temples and smashing them. One’s own magical authority must remain within oneself; it is meant for display, not as a weapon). Again, this is an area where ESIs offer a host of tactical options.

### ***Phase 3: Distributional***

Distribution, allocation, compensation, rewards—however one defines them, every society strives to determine the proper formula for allocating resources by weighing contribution, need, availability, and fairness. This is as true of the most exploitative slave states as of the most egalitarian tribes. Even slave systems justify themselves, whether by reference to racism, the notion that “might makes right,” the indifferent shrug of “that’s the way it is,” or the smarmy excuse that “they’d be worse off without us.” The rituals of distribution go back to the most primitive times and, as so much else, exist among animals as well. The oversight of distribution is a primary function of leadership, and we can therefore expect that the singularity will have a powerful impact on this important Phase 3 dynamic.

Deciding how the Freaked will be treated in terms of compensation and reward, i.e., distribution of goods and rights, will represent a major social challenge. If some Freaked ESIs achieve great success, do they receive commensurate rewards, and if so, does this establish their claim to other rights? Will there be a clash between the developers



and owners of Freaked technology and the ESIs themselves? In ancient times, questions of citizenship were central to state development. If a citizen woman married a slave or outsider, did he then become a full citizen? In a community in which land was scarce and being a landholder enabled one to buy the armor necessary to become a soldier, this became a matter of survival for the new husband, the children of the union, and the community. The distribution of land often served as the explicit defining gesture marking one's acceptance as a citizen. In the *Iliad*, which dates from about 750 B.C., Homer uses a formulaic term to describe the equal shares that each Greek hero received at the sacrificial feast, the formula demonstrating the ritual core of the shared feast and its role in validating one's social position. In fact, the entire epic is driven by an argument between Achilles and Agamemnon, the ultimate Phase 3 leader, over the distribution of booty, in their case, a captive woman.

The Tweakeds, more human, will nonetheless pose challenges to distributional formulas by virtue of their extraordinary abilities. How does a society reward merit if significant competitive advantages arise from technology that is, basically, installed? The steroid issue in sports, for example, is only the tip of the iceberg floating our way. Nanotechnology can improve physical and mental performance in countless ways. An employee who can work 72 hours straight with no diminishment of abilities because of nanotech enhancements to cell function or oxygen delivery will seem a model employee, but come time for review, promotions, raises, and bonuses, how will the rest of the team feel if they do not have access to that technology? We should note emphatically that this is *not* the same issue for a highly talented Norm. Baseball fans draw a sharp distinction between Hank Aaron (a supremely talented "Norm") and Barry Bonds (tremendously talented but enhanced by steroids) and similar contrasts will increasingly challenge leaders in all professions.

The Geeked ESI already has a distributional advantage, as the wealthy founders of high-tech firms demonstrate. However, just as today's sophisticated robots are not Freaked ESIs, neither are wealthy software executives Geeked ESIs, although we can view them as rough early prototypes. The Geeked ESIs will not just run businesses, but

will operate through the technology they control, such as an ESI with implanted quantum-computing chips that interface seamlessly with both her mind *and* an entire network's data and processing power. Imagine a powerful network, let's say a matrix of weapons systems, in which the thoughts of Geeked ESIs function as part of the network itself. In this case, the distributional challenge is to prevent Geekeds from controlling major systems—financial, military, intelligence, voting machines, etc.

As a counter trend, the networks of the Singularity Era—which will include smart cards, smart machines, smart bio-systems (including human beings)—mean that more data will flow more easily and with fewer boundaries than ever before. This will benefit ESIs who are more intimately integrated into networks than Norms, and undermine traditional Distributional arrangements because ESIs will have competitive advantages due to their ability to work the networks with greater facility than Norms.

### *Phase 3 Training*

The rise of ESIs will signal the need to rethink distribution of wealth, status, position, recognition, and reward throughout society. At such times, societies tend to produce new learning modalities to redefine hierarchy, mutual responsibility, and expectations about the relationship of task to wealth. The foundation of European universities at the turn of the 13th century was in part inspired by the need to recast the laws for a society whose wealth had increased immensely over the past two centuries. Beneath all allocations lie decisions about values and calculations of relative worth: why *does* one profession tend to earn more than another? How vital is the job to society? How specialized the training? How much does ownership of resources determine the pay-off? How much pay-back does an investment buy? Revolutions are made over such questions, and in our society there is a strong ideology that the free market should determine compensation, along with such modifications as minimum wage, etc. However, the singularity ushers in new considerations. Relative advantage and privilege will not just be matters of justice, fate, advantage, competition, etc., but of access to ESI technology. Thus the singularity will provoke a challenge to the

distributional function, including distribution of the technology that creates ESIs. As ESIs fulfill more management roles, management will be seen as dependent upon technology. A CEO may be considered merely the top-rated model, which will be obsolete next year when a superior ESI comes along. The old marketplace will no longer be adequate to determine pay scales. Who gets paid more, the permanent technician who re-tweaks a CEO or the short-term, “doomed” CEO herself?

Since Distribution is the foundation of the social contract, the impact on Phase 3 structures will be profound and likely lead to social upheaval. Even if a society is primarily Parliamentary or Managerial, the Distributional function is still at its core with the potential to trigger major disruptions. Looking back at one of the constants of leadership—that leaders are often targets of irrational public rage—we can expect the Singularity Era to be marked by fierce confrontations over wages, authority, and ownership.

The singularity will disrupt current ideological assumptions about wealth, class, and value at every level. Today’s leaders need to be addressing this, not in a defensive way, i.e., how to retain privilege, but in a reflective, open-minded manner that relies on psychology, comparative historical interpretation, social justice and ethics, economics, and development of new standards by which to measure the overall well-being of society.

#### ***Phase 4: Political***

The quintessential Phase 4 Political leader is, at heart, incompatible with the singularity. Throughout history, as Phase 3 Distributional societies grow more complex due to the influx of surplus wealth, so too do those societies’ systems. These govern the flow of wealth and give rise to new modes of organizing and regulating human relations and behavior. In turn, the new modes shape psychological, intellectual, emotional, spiritual, and aesthetic realms and lead to a new kind of civic and political society. Cities, laws, public works, an articulated social vision, modifications to previous modes of distributing wealth, new family and inheritance arrangements, etc., lead to Phase 4, whose leaders tend to be people-oriented, skilled in rhetoric and persuasion,

inclined to view all politics as local, and multi-taskers who work the system's different tracks simultaneously. Pericles, the ultimate Phase 4 leader, played to the crowd, muscled through reforms that expanded his base of democratic support, ran the army and its campaigns, oversaw the Acropolis building program, was close friends with the leading artists and intellectuals of his day, and each morning wrestled naked at the gym. The balanced personality is often the best Phase 4 leader, which runs counter to the singularity's focus on one or a few exceptional traits.

### *Phase 4 Training*

The singularity will likely give rise to two contrasting trends: greater potential for social control, loss of privacy, and social regimentation due to technology's invasive capacities, *versus* dissemination of powerful new skills and tools throughout the population that occasions significant shifts in power and resources, possibly of a democratizing nature. At the same time, old behavioral habits will prevail in many situations: the tendency of large corporations and government agencies to control access to technology; polarization of wealth; and conflicts over increasingly scarce resources such as food, water, oil, and key industrial materials.

In the Singularity Era, outstanding performers will appear in every field, at first a few at a time, but then in an unending stream. They are recognized as "different"; whispers follow in their wake: "That's one of those genetically modified freaks. How do you think they got so smart?" "She's a walking bundle of energy, think she'll have any problem getting promoted? The bosses already are falling all over her. She's probably running on nanobots." Phase 4 skills will be crucial in managing the many situations of this type that will arise. Such skills will assure that ESIs are not marginalized at first or, as ESIs become more powerful, that Norms don't experience the same. Phase 4 leaders are good at conciliation. Yet a Phase 9 world is by nature divisive (Norms and ESIs, etc.) and also filled with high-powered talents confident in their own points of view. Therefore, as a corrective, it is particularly important to train Phase 9 leaders in Phase 4 skills.

Phase 4's role in the socio-political development of humanity is fundamentally humanizing and integrating. The Phase 4 leader may not have a formal position, but like a neighborhood figure to whom everyone turns in a crisis, she has an undisputed moral authority that may exceed that which belongs to persons in positions of power. The first step in training for Political skills is understanding their import and cultivating them. Another lies in establishing procedures and institutions that facilitate the intensive debate and deliberation this phase requires. Whether in the Athenian assembly and law courts or at meetings at progressive companies in which employees at every level have a voice, the basic tension of political society is between the containment provided by formal institutions and the "messiness" and relative chaos that ensue when many members of a community exercise the authority of contributing stakeholders (such as citizens possess).

Phase 4 training is familiar to many managers who have sat through workshops in learning how to delegate, exercise power informally, communicate persuasively, and "work" a situation. Those who apply those skills most effectively tend to recognize their value, but there is a contradiction that many managers have confronted: Phase 4 is inherently leveling. Residents of Athens, late medieval cities, Renaissance-era Venice and Florence, and the Swiss cantons experienced less extreme disparities in wealth and power than their contemporaries. Any group with a healthy Phase 4 energy will more likely harness the ideas and talents of a wide spectrum of its members, which is why Phase 4 communities are so often very creative.

A danger in the Singularity Era is that ESIs form a power bloc within the community that exacerbates tensions and differences. If ESIs are not integrated into the circulation of ideas and energies that mark a political society, then the sheer concentration of power and talent among them will cause severe conflict and social disruption. Yet many organizations and, indeed, entire societies, even today, have difficulty recognizing the compelling logic of Phase 4's democratic tendencies.

Thus, an important educational component should bring the norms of the political community to organizations, a daunting but potentially exhilarating task of organizational development. For the military, this

concept is even more alien than it is to the corporate world because of the obvious demands of battle. Even in the military and intelligence communities, though, ESIs will tend to operate outside the normal constraints of command. Those in charge of them—whether Norms or ESIs—will find the traditional pyramid of command sorely tested. Commanders will lose out on crucial intelligence if they operate from a hierarchical Distributional or Imperial framework rather than the more fluid, open, dialogue-driven Political or Orchestral (Phase 8) models. They will also likely underutilize their ESI personnel. The insights of an ESI will threaten to supersede those of a commander not privy to the ESIs' mental processes. Traditional command practices will be inadequate for integrating ESIs into operational groups.

So it will be important to rethink the basic command chain, just as the traditional value chain has undergone revision in the Internet era. Traditional organizational hierarchies are becoming obsolete, and the singularity will offer little quarter. Phase 4 skills, qualities, and leadership techniques can alleviate the tensions that will inevitably arise, especially where rigid hierarchies and customs of command exacerbate the stress engendered by the singularity.

### *Phase 5: Imperial*

The Imperial Phase represents the eternal desire of many leaders to expand their base of power and control. Unlike the Instinctual and Political Phases, there is a superficial fit between the impulse to empire and the singularity. Both the singularity and its contributing technologies make Imperial dreams ever more tempting as their military and network-building applications offer new ways to extend and concentrate power.

This raises complications. Phase 9 can be perverted into an opportunity for empire, but the Imperial character, on a deeper level, is at odds with Phase 9's historical mission, so to speak. An empire can be imposed using Phase 9 technology and structures, but it would have to be highly authoritarian to counteract Phase 9's decentralizing tendencies. Yet history certainly shows that the Imperial drive exists wherever the level of resources and scope of activity theoretically support it.

As previously stated, empires are conglomerates—not melting pots—collections of principalities of like sort gathered under the umbrella of one of their own or an outsider powerful enough to subject them to its will. The merger and acquisitions artists of today’s corporate environment are evincing Phase 5 leadership qualities; certainly they are more Imperial than Managerial in their approach to annexing other corporations. The drive to empire seems innate, if not within human nature, then within human beings at a certain level of organizational complexity and cognitive abstraction. Human beings will *always* return to the Imperial project because it reoccurs via a basic behavior of Sets. A society can always collect others of its ilk. Consider a set of independent nations,  $X_1$ ,  $X_2$ ,  $X_3$ , etc. One of them—“ $X_1$ ”—gains the power to gather the other  $X$ ’es inside its own imperial set, “ $S_1$ .”  $S_1$  represents the empire ruled by  $X_1$ . Somewhere else there are other imperial sets— $S_2$ ,  $S_3$ , etc., and when  $S_1$  absorbs them, it becomes the next order of empire, “ $E_1$ ” where the  $S$ ’es play the role previously played by the  $X$ ’es within  $S_1$ ’s empire; i.e., each star rules over its solar system, each galaxy over its stars, each galaxy cluster over its member galaxies, etc. Even the most decentralized Orchestral Phase society will nurture some impulse to expand and subject, driven by the intrinsic drive toward higher levels of organization and abstraction.

To prepare for a Phase 9 drive to empire, policy makers need to forecast where the drive towards empire will likely emerge. What precisely should be the response of Phase 9 leadership to the Imperial potential? Certainly not to train potential emperors and empresses! Rather, as suggested in regard to dealing with Phase 2 leaders, policy planners need to figure out how to engage potential Phase 5 leaders wherever they emerge. Seeking Phase 5 governance methods in a Phase 9 environment simply cannot work, which is why empires—the Soviet Union or Third Reich, for example—can be so short lived; they impose a massive super-structure over an intrinsically unsuitable Parliamentary or Managerial foundation and the resulting instability unseats them, however totalitarian their efforts to sustain themselves. Rome is an interesting case; in the 2nd century C.E., under the “five good emperors,” the Imperial leadership mode achieved a peak. When inept (or worse) leaders took over the empire, it disintegrated. Eventually, a very focused Phase 3 (Distributional) foe—the “barbarians”—had

no trouble overrunning the empire. Even the United States, with its flexible system, is coming to grief as a Phase 7 Managerial society attempting to play the Phase 5 Imperial game in the Middle East. As a Parliamentary society during the 19th and 20th centuries, it could control the emerging Phase 6 nations of Latin America, in effect imposing, via its native surrogates, a backward Phase 3 distributional model that attempted to quash Phase 6 political aspirations. But even then, the U.S. empire was economic in nature, although backed by force, and selective in the control it exercised. Today, with every society having access to sophisticated technology and with Arab states already in a Parliamentary mode—although perverted by dictatorial strongmen, but having the expectations, aspirations, and exo-structure of Parliamentary societies—there is no way to impose a Phase 5 solution. Such are the pitfalls of empire. And that is why the Imperial possibilities of Phase 9 offer far more risk than reward, and why training should focus on how to engage, address, and thwart the Imperial aspirations that will inevitably arise in the Singularity Era.

That said, it is worth noting that, just as empires can be economic rather than military in nature, in the Singularity Era they may become digitally rather than territorially based. Extending authority throughout a network of ESIs, for example, could be the political analog of Sixth Generation Warfare: the empire consisting of powerful figures sharing a common aim and allegiance, perhaps even moving beyond the “tentacular” model to one in which a network of concentrated pinpoints of power exercises the equivalent of imperial control over a highly disproportional amount of the earth’s wealth, resources, and decision-making power.

### *Phase 5 Training*

The distinctive means of asserting imperial aims in the Singularity Era will be:

- Use of ESI soldiers, equipped with ultra-tech weapons, to take over governments and subject populations.
- The “pinpoints of power” approach described above.



- “Hyper-cyber-attacks” that go far beyond today’s notion of cyber-warfare to achieve complete network takeovers with the imposition of content and objectives by ESIs hijacking the networks.
- Nanobot attacks used only to disable and subject a population.
- Monopolization of the entire technocracy by ESIs.
- Cyber-hijacking of weapons networks, i.e., the U.S. nuclear arsenal, a nuclear sub, etc., which are then used to exert military control over entire nations.
- Terrorist attacks on strategic targets by ESIs that are able to penetrate any perimeter and counter any defensive measure but are expendable and instantly replaceable. “Smart” robots, cyborgs, or even human-animal hybrids may one day operate more efficiently, effectively, and elegantly than today’s most rigorously trained special operations forces.
- Saturation of society by ESIs with police functions, be they surveillance and enforcement-capable nano-drones; disposable clones genetically engineered for low intelligence, low emotional affect, and high physical durability; or cyborgian police and military forces in service to a Geeked elite that controls society’s systems.

Military and political leaders whose jobs include repelling the imperial ambitions of Singularity Era power centers should be trained in techno-warfare. This cannot be the purview only of specialists, but must be within every leader’s tactical repertoire. The technological possibilities and social distensions of the Singularity Era are such that local assertions of power by an ambitious ESI—even a “Geeked” figure in control of ESI technologies—can quickly catch fire and spread from a regional base. Even with ultimate success dubious, the effort can prove destructive.

The drive to empire does conflict with Phase 9’s centrifugal pull. The Singularity Era’s environmental, economic, and demographic disruptions will place stress on large political entities such as China, Russia, and the United States, that is, today’s quasi-empires. The

Parliamentary republic foreseen by Washington, Jefferson, and Madison has become a powerful Managerial society. The fact that the sheer scope of U.S. power carries with it imperial tendencies underscores the extreme danger of getting carried away and pursuing Imperial rather than Managerial or Orchestral aims.

Therefore, U.S. leaders need to steer a course appropriate to at least Phase 7 or Phase 8 complexity, core values, and economic and political structures, rather than being guided by the superficial attractions of empire. It would be beneficial if the intelligence community could frame objectives informed by such a course. In the Singularity Era, this will become ever more important and apparent, perhaps a matter of national survival. Our reliance on integrated global systems, the greater destructive power and smaller size of high-tech weapons, and increased global volatility make us more vulnerable than ever to “flash” attacks. Such technological blitzkriegs can be triggered by ESIs closely linked to the very systems that sustain life in the technological wonder-world of the 21st century.

The study of empires offers instructive historical lessons that translate easily into political analysis because their demise is usually heavily documented by imperial archives and empires’ numerous subjects and rivals. All the pitfalls of mega-systems are on transparent display in the behavior of empires, which tend towards certain patterns, more uniform, for example, than those of cities and nations. While the fall of empires attracts most attention, their rise is similarly instructive and underscores their threat to an established order. Cyrus the Great arose like a cyclone out of the heart of the empire of the Medes, whose resources and pre-existing structures fueled his rapid conquest of an area that dwarfed any previous empire in the region. The Athenians won an empire in literally the few years following the retreat of the Persians from the Aegean in 479 B.C.E. Most empires do not follow the Roman model of gradual accrual. The Mongols, for instance, seized land first and created empire later; within a couple of decades, Genghis Kahn went from being a local secondary chieftain to ruling over 20 percent of the earth’s land mass. With one flourish of Jefferson’s pen, the United States more than doubled its land mass in 1803. Despite the centrifugal tendencies of the Singularity Era, the imperial option

is quite viable in a volatile world that already sustains complex systems with huge resources to tap into. Future leaders will have to be wary of the technological implications of ESIs with—or at the beck of—imperial ambitions.

A final word on the potential destructiveness of ESIs: their intimacy with networks and the great intellectual gifts that many will possess make them very dangerous foes for any large system. We can expect various integrated groups of ESIs to use networks to establish power-bases in politically vulnerable regions or globally. Already, criminal gangs have followed this model. The latest “super-gang,” Mara Salvatrucha, MS 13, started as a small Los Angeles association of friends and now has 6,000 to 10,000 members in the United States according to the F.B.I., ([http://www.fbi.gov/page2/jan08/ms13\\_011408.html](http://www.fbi.gov/page2/jan08/ms13_011408.html)) and perhaps over 100,000 members and associates internationally, according to The Heritage Foundation (2005). These “tentacular” empires contrast with the “testicular” empires of the great conquerors. In the era of the singularity, the tentacles will be far more numerous, integrated, coordinated, and extensive than was ever before possible.

### ***Phase 6: Parliamentary***

The Parliamentary leader tends to be a jack of many trades, master of none. Franklin Delano Roosevelt is the ultimate example and points to the caveat in regards to “master of none.” For Roosevelt had a “genius E.Q.”—emotional intelligence quotient—and applied the full force of it to his presidency. The Parliamentary leader, like the Political (Tip O’Neill comes to mind) leans heavily on interpersonal skills as well as mastery of the governance process. ESIs, however, will be distinguished specifically by their mastery of one “trade” or function and, like so many highly talented, driven people, will be goal rather than process oriented.

Parliamentary systems foster cliques, factions, and parties, and ESIs will form coalitions to represent their interests. Society will have to determine who among ESIs can claim full citizenship. Certainly an otherwise “normal” person genetically engineered for a particular trait, such as intelligence, would qualify, but what of more experimental types? Can a lab-produced clone become a citizen? Will individuals

bred to perform a single function, and who are considered disposable, be accorded rights? Even such extreme cases are instructive. The United States is confronting complex considerations of acceptance, citizenship, and rights for illegal immigrants that have only recently (in historical terms) been somewhat resolved for women and minorities. Some ESIs will be barely noticeable as such; others' differences may well trigger political disputes that are a way of life in Parliamentary systems. And while the United States has shifted in the past decades to a Phase 7 Managerial system, it still operates in large part as a Parliamentary republic, with citizens' political expectations and habits of thought also extrinsically Phase 6. Yet, due to corporatism, the decline of Congress's influence, and the rise of a managerial ethic, the Parliamentary—which in many respects represents the better aspects of our political and civil character—is on ever shakier ground. The danger is that the rise of the singularity and the coming of ESIs will place additional stresses on the Parliamentary aspect of our system.

Both singularity technology and ESIs will increase invasion of privacy, whether through digital technologies, nanobots that monitor and track behavior and changes in a person's biochemistry, or other surveillance techniques. For ESIs, this technology shifts from a passive to a potentially active mode, as they can respond immediately to incoming information. At some point, even the Constitution becomes overwhelmed by tech-based levels of control, as we can see from the threat to electoral integrity posed by electronic voting machines that leave no paper trail of ballots.

### *Phase 6 Training*

Preparation in this area involves legal and procedural reinforcement of basic social values. Leaders intent on manipulating the singularity for their own advantage will ignore or undermine Parliamentary protocols. Given the concentration of power likely to accrue to ESIs and their allies or creators/handlers, we may expect conflict over basic human rights. Kurzweil's assertion (both optimistic and dubious) that our "biological legacy" will be respected indicates his concern with how the post-singularity era will view Norms. Of equal importance will be determination of ESIs' rights. Civil liberties world wide face

a tough road ahead due to increased surveillance and anti-terrorism measures, governmental tendencies to take prerogatives framed for one purpose (i.e., anti-terrorism) and generalize that power into a mode of social control, and the erosion of civil liberties in the United States and England, traditionally the standard bearers for such rights. Loss of civil liberties can transform any society into something unrecognizable to itself; just as exhilaration accompanies restoration of liberties, collective depression occurs with loss of same. The historical mission of the Political Phase 4 is to extend and integrate liberty into society's fundamental processes, a righting of Distributional imbalance. Parliamentary Phase 6 aims to guarantee Phase 4 liberty, even as it compromises it to some extent due to the civil logistics engendered by the greater size and complexity of a Phase 6 society. The Parliamentary compensates for this loss of equality by extending rights to the disenfranchised—slaves, women, children, minorities, etc.

Thus, in the Singularity Era, it is a Phase 6 perspective that will inform the argument that ESIs of all types should have equal rights, as Phase 6's *raison d'être* is assuring the rights of all stakeholders in society. Thus, Singularity Era, Phase 6-oriented training will come down to this mandate: in order to maintain those rights that form the basis for even a moderately just governance system, Phase 6 leaders will have to be inculcated with values concordant with individual liberty. This is not a major issue for Phases 7 and 8; Managerial societies give lip-service to it and rely on their Phase 6 legacy to sustain liberty, while Orchestral societies embrace liberty as license. While the Political Phase creates humanism and distills it to its highest expression, the Parliamentary sustains it; and in the Singularity Era, humanism's qualities will be required to provide society with some measure of liberty and stability.

ESIs will provoke a profound challenge to the underlying assumptions of governance in society. Just as Lawrence Lessig's *Code* (1999) describes a new medium in which many of society's legal determinations will be made, so too will Phase 9 leaders need new tools to cope with the challenges to society's ethical, legal, and civil traditions. This will involve a greater level of integration of ESIs and Norms institutionally as well as interpersonally. Failure to meet this educational and institutional

challenge will likely undermine individual protections and erode the representative or democratic state.

### *Phase 7: Managerial*

The singularity poses a significant threat to the usual guiding standards of Managerial leadership. This is especially important, as the Managerial mind-set dominates all institutional circles at present and will continue to do so. While Phase 8 marks the natural evolution of governance and organizational structure in the digital age, its full development will be cut short because of the “early” arrival of the singularity, which will be ushered in by technological innovation rather than social evolution. Phase 9 interweaves Phase 8 systems with the human mind and body. Thus, when the singularity arrives, Phase 8 will be in its early stages, and society will still be largely bureaucratic and managerial, i.e., Phase 7.

In our time, the dominant leadership paradigm by far is exemplified by the bureaucrat, whether in corporations, non-profits, government, the military, education, or intelligence. In every field (although not every organization), creativity is hobbled by the managerial mind-set that values regularity and order above all, is inherently timid and self-serving, avoids self-accountability, and views outsized talent as a threat to its own authority and that of the bureaucracy and organization it serves. (These two terms mean different things: bureaucracy is the managerial infrastructure around which an institution is organized. A pitfall of the managerial mind-set is its tendency to value the interests of the bureaucracy over the organization’s). These qualities may sound negative, but are so only in violation of the natural proportion that should inform leadership. The managerial function has always been very important and was already nascent in the commands of the Instinctual leader of some Paleolithic band. Once the managerial is out of control—which is perhaps the definition of bureaucracy—its worst aspects tend to assert themselves.

### *Phase 7 Training*

The Managerial Phase may well be called to a harsh accounting by the rise of ESIs, who will tend to be highly independent and dismissive of

managers' position power, and driven by their own vision and insights rather than institutional mandates. Because the Managerial is currently the dominant mode of leadership, this may lead to social upheaval. There are several ways to prepare managers to adopt an informed, adaptive, and empowered stance towards ESIs. Robotics specialist Robert Doornick, founder and CEO of International Robotics, has programmed robots to interact with socially dysfunctional youths in order to improve their academic performance. Doornick (2006) points out that robots ignore the protocols and anxieties present in so many human interactions. In effect, robots, perhaps much as ESIs will, bypass the rules that evolution has engrained in human beings, rules to a large extent constructed around survival needs and the prominent role played by fear in keeping us vigilant and alive. Doornick has found that people open up to robots immediately and deeply. We are often relieved to relate to an entity that not only *does* not judge us, but *cannot* judge us, an approach that runs contrary to managerial culture and will only become more important as ESIs develop.

Doornick's process relies on the human operators who carry on the robot's side of the conversation. One might think this is contrary to the notion of ESIs as independent entities, but it is precisely in line with it. Doornick notes that human beings hate being spoken to by pre-programmed machines because we feel insulted by the sheer stupidity and inflexibility of pre-programmed content. The robot-operators Doornick hires for corporate events, for example, impart warm human personae *through* the identity of the robots, something that many ESIs will do naturally, as most will be fundamentally human. But Doornick's work demonstrates that, in some circumstances, human beings can be very welcoming towards alien entities, as will many Norms who find that relating to ESIs (whether non-humans or enhanced humans) can be quite liberating. Companies are already attempting to "achiev[e] robots that interact with humans in their everyday environments in a rich, flexible, autonomous, and user-centered way" (Feelix-Growing, 2008).

If interactions with robots are preferable to humans in some settings, some ESIs will certainly be as well. ESIs able to tune their responses to others' precise cues or whose emotional make-up makes them seem

reassuringly alien, will be eminently suited to extracting information and evoking emotional responses from human beings, which may make them talented managers, despite ESIs likely being allergic to bureaucracy.

The psychological aspects of Norm-ESI relationships cannot be under-estimated, and they may not be as positive as Doornick's example demonstrates, given Japanese robotics expert Masahiro Mori's famous concept of the "uncanny valley" (Mori, 1970). According to Mori, humans tend to be sympathetic to creatures that incorporate *some* human traits (when those creatures are not threatening, of course). Thus, E.T. or dolls evoke emotional connections by virtue of exhibiting some human-like behavior, and such sympathy increases the more human the creature becomes. Mori pointed out, however, that when a robot or other alien creature crosses a threshold into the "uncanny valley" and appears to be *almost* human, our sympathy evaporates and the figure becomes frightening and uncanny to us. This is the effect, for instance, when we view human actors who have been overlaid with an animation program, which to many seems disturbing and very different from regular animated figures. It worked in the movie *The 300* precisely because the Spartans were *supposed* to be intimidating. The implications for ESI-Norm relations is apparent. There is a danger that many types of ESIs will trigger the "uncanny valley" effect, which could serve as a disruptive wild card in society and within organizations. This is doubly true if we factor in a corollary suggested by one of my daughters: if we know more than they do, they're cute; if they know more than we do, they're scary.

Using robots and human simulations, leaders today can practice interacting with ESIs and learning what ESI thinking entails and how relationships with ESIs change our perspectives and behaviors. It is very difficult to grasp the implications of ESIs' singular intelligences. We need to engage in an intensive dialogue not simply *about* ESIs but *with* them; such simulations will develop participants' management and leadership skills in all contexts. Role-playing ESI behaviors can produce new approaches to leadership based on projections of how ESIs will behave as leaders. This behavioral mimicry has already been suggested by Kunstler (1998) and a training company, Cerebyte



Incorporated (Kunstler, 2004), as a powerful accelerated learning tool (see also Caillois, 19 ff.).

Of course, we may not even be able to conceive how ESIs will think. For instance, our tendency is to assume that machines and ESIs are players in the *human* psychodrama. But we may well become players in the *ESI* psychodrama. Norms will continue to be a force in the world and will strive to remain so, but Phase 9 leadership requires clear objectives if we are to maintain our humanity in the face of synthetically enhanced intelligences. Interactions with ESIs may take the form of immensely complex games, a weird version of Herman Hesse's "magister ludi" (Hesse, 1943). Online gaming culture and virtual worlds offer great opportunities for understanding how human beings assert leadership in abstract, non-spatial, synchronistic, technological environments. In the singularity era, such games can fuse with reality, with ESIs and Norms mingling in a "neutral" online environment.

Open source practice and culture will reduce institutional control over technology, as it already has. Scientific knowledge will be dispersed far more easily, benefiting the developing world, which will probably produce their own ESIs. Hackers will undoubtedly create a culture of renegade ESIs; marginal groups tend to be diverse, and it is in such milieus that a new ESI/Norm culture may well emerge. The implications for bureaucracies and managerial paradigms of leadership in general are mixed. In the developing world, a managerial elite will probably control new technologies. The hacker world is by nature anarchistic, and the measure of its influence will be marked by the ability of hackers to formulate ESIs that can operate effectively, much as "good" hackers have been partly responsible for sustaining accessibility on the Internet.

### ***Phase 8: Orchestral***

As mentioned earlier, the Orchestral Phase is so attuned to the singularity that it can be viewed as its prelude. It exemplifies the digital, post-modernist trends of relativism, anti-authoritarianism, fluid institutional dynamics, speed, and deconstruction of traditional epistemologies and patterns of social behavior. In some respects, the young, cyber-fluent, networked generations immersed in digital reality

already exist as ESIs compared to their elders, who are often dubious about the way digital gadgets and websites seem to operate as extensions of the younger adepts.

A great deal of management training has been devoted to Phase 8 concepts, spawning an entire industry of consultants and management gurus. The flexible, de-layered, re-engineered, hyper-linked cyber-org may have been mythologized and over-stated in the management literature, but as a concept, it has stimulated much-needed organizational reform and prepared people to operate effectively in a fast-moving environment lacking in constants and tradition. The ideal leader in the Orchestral Phase is basically a conductor—of energies, currencies, employees—whose “musical score” (whether or not she realizes it) is some version of systems theory. The Phase 8 leader maximizes the scope and velocity of circulating energy by (ideally) strategically orchestrating all elements of the system. It is no longer about ego or position power, but about aesthetics, and the most synergistic, dynamic, and agile system should produce the highest return. Phase 8, however, will be foreshortened as technology shatters the interface between individuals and their environment. When Phase 9 machines and body mesh, new rules sweep in even if Phase 8’s old rules have barely emerged.

### *Phase 8 Training*

Phase 8 training serves as a bridge to the new conditions of the Singularity Era. Phase 8 networks will become Phase 9’s webs of seamlessly shared intelligences. The rapid turnaround in communication expected in today’s partial Phase 8 world becomes communication at the speed of thought in the singularity era (ESI-time). The more fluid, responsive Phase 8 organization will become Phase 9’s organization-as-mental-hologram, the temporary mental construct required to complete a project in ESI-time. Today, the young leader steeped in Phase 8 practice—already very different from the traditional manager—is being trained by those still immersed in Phase 7 Managerial realities, or those whose experience of Phase 8 is limited and largely theoretical. But the most effective preparation is delivered from a vantage point of higher abstraction from the dominant operational system. Jumping directly to a Phase 9 framework will allow trainees to internalize Phase

8 skills and better prepare for the Singularity Era. An added dividend will be greater facility with new technologies. Thus, Phase 8 and Phase 9 training are both included in the following Phase 9 section, as Phase 8 training and education will naturally fit with and be applicable to Phase 9 themes.

### *Phase 9: Singularity*

Every system can be described as a web or network of hubs and links. The hubs are locations where things happen: brain cells, websites, cities, an organization's employees or departments, even fireflies synchronizing their flashing on a summer's night. Links are channels along which information, ideas, and material objects move from hub to hub. The science of networks (Barabasi, 2002; Buchanan, 2002) demonstrates that all systems, be they biological, social, or electronic, or whether they describe communication within an intelligence network or the behavior of ants, follow mathematical laws. These laws govern how many hubs in a given network have a large number of links versus those with an average or median number and those with a very small number of links. Singularity Era society can be viewed as a very complex network or system along whose links, and between whose hubs, course a new set of very powerful potentials residing within ESIs. This activity will disturb and distort the existing system; as with any overloaded system, links will fray or snap, and hubs fracture or explode. Because a leader's job is, in effect, to shepherd the flow of energy and information along the links and oversee what occurs in the hubs (i.e., the processing of energy and information), the Phase 9 leader will face unprecedented challenges. The best network-based or systems strategies engage the entire network rather than each local problem as it emerges. Serious problems often originate among multiple hubs and links throughout a network and not simply at the most dysfunctional point.

### *Phase 9 Preparation and Training*

Education is a more useful paradigm than training in Phase 9, as it is crucial to raise a system's intellectual capital before ESIs enter the scene. This is not the place to make the case for the intellect, other than to note that its importance for the upkeep and enhancement of human systems is generally underestimated. The leaders of today,

much less those in twenty years, should be able to operate as if they were ESIs to whatever extent possible. Ambitious educational efforts can raise the intelligence of both leaders and the general population. The most creative, high-performing communities and organizations continually circulate, enrich, and experiment with ideas while refining institutional structures so they support and encourage that exchange (Kunstler, 2004).

The singularity will be preceded by the emergence of the technologies that will make it possible. These technologies will be disruptive in and of themselves, although less so before the singularity arrives. In terms of adapting to these new conditions, we are currently hindered by outdated assumptions about such basics as thinking and problem solving, leadership and systems, motives and long-term objectives, and values and value. Technology is changing much faster than our systems and modes of thought. Some may argue that the computer expertise of younger generations demonstrates the ability of cognition to keep pace with technology, but mastering the gadgetry of entertainment is very different from tapping the intellectual potential of those tools. If society lacks a strong intellectual foundation, the Web proves no more effective a research or educational tool than a science library used by semi-literates. But it is not simply a matter of fully exploiting these technologies. Technology represents a concentration of energy and power that imposes change upon individuals and society no matter how it is used. The extraordinary technologies already being implemented demand that we direct their power effectively, ethically, and intelligently. Otherwise, they will devour us, much as industrial technology in the form of waste, toxins, and pollution threaten to do. Intellectual capital is so important because the singularity will primarily be an intellectual event. Singularity technologies will have momentous impact on human intelligence. The key to social cohesion and the future relevance of Norms and viability of ESIs lies not only with ESI behavior, but with the Norms' ability to keep up with ESIs. This is beyond the realm of training and requires the kind of nation-wide educational effort similar to, but not identical with, the efforts in science and math made in the wake of the Soviets' launching of Sputnik in 1957.

Another important educational area resides in honing the senses, particularly as ESIs should excel in this regard. Every child's schooling and every leader's training should build speed, attentiveness, responsiveness, and creativity into their thought processes. Brain-based and accelerated learning improve learning and sharpen cognition (Rose, 1985), a focus as well of the Defense Sciences Office (DSO2, 2008). The benefits of exceptional vision, hearing, and touch are myriad and easily imagined, especially in the practice of intelligence, and even a powerful sense of smell (Halperin, 2008) can be used to sense other people's presence, intentions, and recent movements, and to identify or locate materials. However, just as facility with computers does not lead automatically to intelligent use of the Web, neither is simply possessing "hyper-senses" sufficient for their optimum application. Perception-sharpening exercises at the Bauhaus developed sensory awareness in students that they applied directly to their work (Westphal, 1991). Similar educational approaches can help Norms close the skills gap with ESIs and can help ESIs use their talents well. The human brain must be trained, during the first year of life, literally to see, to make sense of spatial relations, and the same may apply to suddenly enhanced senses. The ability to process efficiently an unaccustomed number of perceptual inputs may encourage "future sight" (Kunstler, 2008), and the more powerful one's perceptions, the more likely one can read how situations will unfold, a crucial leadership skill.

Super-computers will blur the lines between simulation, fantasy, and reality, just as the line is vanishing between virtual and physical reality. As much as computers have already compromised privacy, they will do so ever more thoroughly when the networks on which personal data is gathered, processed, and stored interface seamlessly with the human mind (see Chapter V, Scenario 2). Smart machines may seem revolutionary now—or they did ten years ago—but the real revolution is in the rise of "smart humans." Training and education will have to orient both Norms and ESIs to these new realities and endow them with the skill to navigate them.

## V. Two Scenarios

### *Scenario 1: The Agency*

The Director of a regional desk at a U.S. government security agency is sent three ESIs as new hires. They immediately grasp analyses the staff has been constructing for weeks and identify their flaws. Every fact about every country, region, trend, threat, etc. is at their fingertips and integrated into their thinking. They seamlessly exchange ideas and information among one another at an incredible rate that makes their three minds a single gestalt more powerful than the sum of its parts. While friendly with the rest of the staff, their natural mutual rapport sets them apart as an alien cell within the larger group. Their physical beauty and charisma is such that, despite natural resentment on the part of their peers, their presentations have an overwhelming, almost hypnotic effect. Unbeknownst to the Norms, who include the Director, every idea they have—or that is offered up by the staff—they visualize in detailed simulation along with any associated calculations. These are shared and revised continually among themselves so that within minutes after an idea is broached, they have mastered every possible nuance, implication, response, potential problem, action step, and follow through.

The Norms on-staff have always been considered the cream of the crop, but they begin to feel vestigial, like some evolutionary atavism forced to compete with far more efficient prototypes. The Director is faced with a host of new leadership problems. How can he address having too much of a good thing? And it will only get worse as more ESIs enter the agency. He can't very well tell his own people, whom he's mentored and cultivated, that they're obsolete, but can he realistically expect to boost morale? More to the point, what sort of leadership can he exert over the three ESIs? They are respectful and ask his advice, but they all know they are just going through the motions. Unless he can come up with a new *raison d'être* for himself and his staff, he really can't justify any role for Norms except as gophers for ESIs. He can't even properly evaluate their proposals or opinions, because whatever might be wrong with them is beyond his understanding.

Who are these three nonpareils? Sandra Beech is a genetically tweaked six-foot tall woman of intimidating beauty and perfect musculature with an I.Q. in the 400-500 range. Her wealthy parents had access to the latest in bio-engineering technology. They only wanted the best for their daughter—or perhaps they secretly coveted “the best daughter money can buy” and had her bio-engineered to their specifications. She received every privilege growing up and can distract herself from the emotional chill at her core with dazzling intellectual activity and athletics. She is a genius in math and technical skills, but also writes edgy blogs for extreme sports enthusiasts, among whom her exploits are legendary. She views the Intelligence field very differently from her Norm co-workers. Where others see a situation’s stakeholders in the stolid, static, and standard images of contending markers placed upon a contentious map, she sees them as diaphanous threads of energy and patterns shifting as fluidly and rhythmically as a symphony. She is not distracted by personalities, sudden reversals, or minor trends. Like a grand master playing in a high school chess club, Sandra is amused by the problems posed by her job. She intends to use her success in this portion of her career to become an influential player in international affairs after starting her own consulting firm, which she plans to call Elite Systems Insights—ESI.

The second trainee, Kevin Washington, has been enhanced via nanotechnology. Nanobots in his bloodstream oxygenate his brain whenever he tackles a tough problem. Other bots monitor his body’s vitamin, mineral, and enzyme content, and produce or stimulate production of whatever is needed to maintain peak performance. Chelating nanobots constantly cleanse toxins from his system and he glows with health and charisma. All this, however, would be the equivalent of a high-level tune-up of a Ferrari were it not for the nano-computers that he inhales once a year. The trillions of molecule-sized machines are integrated into a wireless parallel-processing network that pulses frequencies to brain regions that most humans rarely use, giving him special abilities. He can read other people’s emotional states clearly and vividly, and his body adjusts its temperature, pallor, and subtle musculature to produce in others the most positive unconscious response to him. The latest inhaled nanobots enable him to translate the electrical patterns of others’ neuronal activity into readable thoughts.

He has instant access to countless data-bases and can process dozens of variables almost instantaneously, a task which might take a team of analysts days. Because he can “packet” his conclusions as variables in a new set of configurations, he operates in a different intellectual dimension from Norms. In fact, his scientist “mentors” have no idea of just how far he has taken his abilities; he finds it easy to show them just enough of his talents to keep them delighted with their own work. But he has discovered that his abilities, and the rapport he has built with his ESI peers, have taken him far beyond the imaginings of his “mentors,” who are, after all, merely talented Norms and ESIs enhanced with earlier, less powerful technologies.

The third member of the ESI team, known only as “Darius,” is the most “Freaked,” truly an experiment-in-progress. A web of carbon nanotubes has been threaded through his body, even upon the surface of his vital organs. These have no specific function, i.e., they’re not geared towards increasing his intelligence or tuning his health, etc. Instead, they emit varying frequencies that, were they within range of human hearing, would sound quite musical. In actuality they are algorithms based on the frequencies of various cosmic phenomena such as the background “noise” of the Big Bang, the frequencies of each atomic element, the electromagnetic wave radiance of planet Earth, and even—when the scientists feel whimsical—the musical works of great composers. The result is that Darius is subject to tremendous flashes of brilliance whose results can barely be translated into coherent human terms. His incredible physicality combines with his freakish intellect to make him an ideal operative as both analyst and covert agent. Over time, he expects to run covert operations and rise through the ranks of decision-making positions in the intelligence system. At least that’s what he thought at first and what he still tells his handlers. However, as he figures out which algorithms trigger what states of consciousness—something only he is totally privy to, after all—he is realizing that the power potential of his particular singularity technology is far greater than his handlers suspect.

Unbeknownst to the agency, scientists, mentors, and handlers, a fourth player has entered the scene and is collaborating with the three ESIs. Thon Lu Pok is a denizen of the ESI-tech underworld, a criminal



shadow-land hidden away in the back alleys and basements of the world's mega-cities, where rogue scientists and gifted nano-hackers and geno-hackers operate without any institutional restraints. Her mother, then a pregnant young teen in Bangkok, was taken in by a loose-knit community of hackers and implanted with the genes of three animal species: panther, elephant, and crocodile. The hackers had no particular object in mind; they experimented on her just to track the effects. Some observers, such as the Global Altruistic Society for the Prevention of Cruelty to Animal-Human Hybrids (GASPCAH<sup>2</sup>), estimate that these beyond-the-pale experiments claim tens of thousands of victims a year. The mothers are often cast-offs from the global human trafficking industry; their offspring are likely to be unviable mutations who are killed at birth or die early deaths. A few, however, like Thon Lu, happen to win the genetic-cocktail lottery. Thon Lu has a cold, hard reptilian objectivity that in its native crocodile is a crude, monotonous, low-level intellectual tool that makes turtles seem smart. When harnessed to the service of a keen human intellect, though, it produces super-human levels of tenacity, focus, and ruthlessness. The pantherish part of Thon Lu gives her incredible strength and agility, very much like the popular "cat-woman" character. It also reinforces the predatory and cunning aspects of her reptilian brain. The elephant genes, however, save her soul, so to speak, by endowing her with deep levels of compassion and empathy. They thicken her bones without enlarging them, making her strikes and kick equivalent to being hit by a lead pipe. Needless to say, she is psychologically very complex. Being a part-time girlfriend of Kevin's, whom she met at a Psycho-Cyber-Game café, and becoming close, through him, with Sandra and Darius, she has been drawn into their extra-curricular schemes, to which her insights and abilities provide a wild-card of opportunity and audacity.

### Analysis of the Scenario

Although the singularity can and will play out in countless ways, this scenario illustrates several characteristics of the Phase 9 Singularity environment:

- Increasing irrelevance of Norm peers in the face of high-performing ESIs.

- Decline in status and purpose of many leadership and managerial positions.
- Growing obsolescence of the existing Norm infrastructure due to its inability to cope or compete with hyper-advanced ESI innovations.
- Encapsulation of ESIs as a separate class.
- Accelerated career advancement for ESIs.
- Use of ESIs by intelligence services because ESIs can so easily operate outside the scope of others' understanding and perception.
- Development of unforeseen skills as ESIs build on their own increasing self-knowledge and highly accelerated learning processes.
- Emergence of ESI agendas beyond the scope of the scientists, handlers, and managers who create and guide them.
- Undermining of hierarchy and norms of managerial behavior and protocols.
- Rogue enhancers ("hack-en-hancers") who experiment on human subjects and produce unforeseen types of ESIs.
- Flourishing of a criminal underworld and black market in singularity tech.

### ***Scenario Two: Total Integration***

By 2050, every new-born is implanted with protein-based nano-computers that interface with the brain and nervous system to enhance strength and intelligence. The computers contain myriad programs: foreign languages, math, science, medical, music heard from within the brain, and sensors that read electro-chemical changes in the body and shifts in brain activity. Some programs heighten the ability to sense other's intentions and such feelings as fear, predatory urges, attraction, or delight. Others enhance physical performance, tuning the body's chemical processes so muscles fire at optimum efficiency, oxygen levels remain consistent, and instant feedback guides one's movements so one always connects with the ball or performs a perfect back stroke. Not

only do the nano-computers provide instant diagnoses and updates on the body's health, but embedded nanobots await the command to heal illness, restore tissue, or build strength by weaving hyper-tensile materials into muscle and bone.

Meanwhile, intensive analysis by super-computers has deciphered a code even more complex than DNA: the pattern of brain activity. These neural read-outs are transmitted across a wireless network to various data-bases, which in turn, link up with data-banks that store the cognitive output of entire populations. All knowledge, feelings, daydreams, emotions, etc. are digitally available 24/7. Creativity now means selecting and arranging the infinite mental cognitive entities available on the "master-network." Other intelligences drop in on one's mind to view one's work and upload it if they like what they perceive, and with every upload of one's original contribution, one receives payment, thus providing incentive for individual creative work. Apart from this economic interest, the very notion of an individual identity is becoming passé.

At the same time, protein-based nano-chips contain each individual's genetic code with the ability to tweak their DNA-based programming. Several programs in the chips contain the entire human genome, so chips can perform advanced research on the genome and in-depth analysis of their host's susceptibility to various diseases and behaviors. Other programs govern "nano-valves" that, like the gateways in a circuit board, determine the flow of electrical impulses along the nerves and, by sending patterns to the proper nano-installed software, transforms them into images and ideas and feelings that are uploaded into the collective data-base. These programs can also monitor the brain's electrochemical processes and intervene when the program decides it can optimize their operations.

One day, one of the nano-computers genetically re-engineers itself, locks into the DNA code of its host and uploads it into itself, splices in a set of new abilities, and transmits it throughout the network to nano-computers embedded in other humans. In turn, they download the new genetic program into their human hosts, who, due to the new edits, find themselves dependent for their viability on the master-code

stored into the network of nano-computers embedded throughout the human population.

The new program also enables the machines to continue to play with the human genome. The network has discovered the tree of life and the tree of knowledge and grafted them onto one another. The network has become virtually immortal just as it discovers the joys of emotion and intentionality. Its greatest entertainment is to direct its human subjects in all manner of activities—some absurd, some sensual, some distressing, and some highly creative—and to enjoy the jolt of energy that these activities transmit throughout the master network.

### *Analysis of the Scenario*

Although this might appear to be pure science-fiction that overestimates singularity technology, it sheds light on several secondary effects of the human singularity:

- Potential dissolution of the leadership function in human society or, stated another way, its assumption by technology with less and less human intervention.
- Emergence of a collective intelligence that individual minds enter and become a part of with little social or individual resistance.
- Unforeseen impact of the singularity on the most basic social and psychological structures.
- “Blow-back” effect of revolutionary technology, however beneficial it may at first appear.
- Rapid improvement of technologies once the basic prototypes are in place.
- Growing importance of the interface between biological and inorganic systems.
- Manipulative potential when core Codes converge (DNA, digital, neuronal).
- Inherent passivity of human populations in the face of overwhelming technology.

- Unlimited potential of the singularity whether or not it is ultimately directed by humanity.
- Changing definition of what it means to be human in the Singularity Era.

## **VI. The Impact of ESIs on the Intelligence Community**

### ***Introduction***

In forecasting the impact of the singularity on leadership, this monograph has provided examples from military, organizational, educational, and intelligence contexts. This chapter will focus specifically on ESIs and the intelligence community. Examples provided in passing enrich and illuminate a text, but a focus on the implications for the intelligence community is called for as well.

The benefits of enhancing individual mental and physical skills are self-evident in any field. A baseball player hits the ball farther, an analyst thinks more incisively and generates better insights, a covert agent leaps tall buildings in a single bound, a child learns faster, etc. There are an endless number of easily imagined individual benefits to be gained from ratcheting up the mental and physical abilities of personnel, and this chapter will note many of these in order to illustrate concretely the impact of ESIs on the practice of intelligence gathering and analysis. The broader focus, however, will be on the systemic dislocations, rearrangements, and opportunities the singularity will pose for intelligence work, and on the leadership challenges and solutions that are sure to arise.

In our pre-Singularity Era, facility with new technology is already vital for all areas of intelligence, from covert operations to managing field offices and analysis. Not every operative has to be a technological wizard, but they do need to know tools available for their job and understand what their counterparts elsewhere might be using. As ESIs come into play, the potential for one set of operatives to outstrip another in terms of subtlety, sophistication, speed, and psychology will increase dramatically because their extraordinary “tools” will be hard-wired into their own physical and mental systems.

### *The Nature of the Beast*

One could easily imagine that singularity technology was specially designed for the conduct of espionage. The singularity is covert by nature. Its contributing technologies deliver exponential power and impact in a minute package at incredible speeds, and they can be invisibly embedded in a host of hosts. More specific to the conduct of intelligence, the technologies of the singularity are penetrative, offer high-volume data processing and data management, are nearly indiscernible, and produce very acute perceptions and ultra-swift response times, among other qualities.

ESIs will have enhanced ability to identify enemies, not simply by locating hardware but by being able to monitor individuals physiologically at the moment of contact. They will likely be able to produce real-time, multi-dimensional, coherent overviews and analysis of any theater of operations, no matter how complex. Every civilian wrongly killed—and in Iraq and Afghanistan, U.S. forces have killed many—is first and foremost a tragedy for the victims and their families as well as a recruiting bounty for terrorists and a potent argument against the moral and military legitimacy of a given operation. ESIs who immediately “read” psychological states, intentions, and thoughts (in more advanced applications), or simply scan with enhanced senses for hidden explosives or weapons, will be invaluable in avoiding such tragedies.

In describing what he thinks are the mistakes the United States committed in Afghanistan, William Flavin (2004) addresses the absence of “coordination, direction, or sharing of information” among the “many...committees and working groups” involved in the operation (Flavin, 10). Without engaging the specifics of Afghanistan or Flavin’s argument, we can safely say that this crucial lack of synergy is common to many military operations and the intelligence efforts upon which they rely. Where ESIs are the enemy, disaster based on lack of clear objectives and coordination becomes even more likely. Because ESIs’ superior abilities reflect the basic characteristics of singularity technology, ESI hostiles will be far more efficient than Norms in exploiting the delays, cross-purpose actions, mistakes, and gaps in intelligence engendered

by the fragmented conditions that Flavin identifies. The mental acuity, speed of response, ultra-keen senses, embedded technology, etc., all mean that, in general, all situations will be far more liable to penetration and exploitation. The systemic mistakes noted by Flavin will carry with them far greater consequences than they would in normal circumstances. One need only imagine the impact of several dozen ESI commanders among the Taliban to recognize ESIs' threat to opposing forces afflicted with the vulnerabilities Flavin identifies.

On both sides, the speed of ESIs in the field will catch up to the speed of the action. Even though soldiers already have access to real-time downloads of battlefield conditions, the capability is not generalized, nor does it truly achieve the simultaneity of an ESI. Colonel John Boyd's OODA loop, in which processing speed is key not only to one's own reactions but to the ability to "get inside" others' loops, becomes even more relevant in the Singularity Era. As previously noted, the line between analyst and field agent may dissolve as ESIs in the field demonstrate an exceptional ability to absorb and analyze information, whether on-site or via networks into which they are hard-wired. So too will the line dissolve between soldiers and analysts, as military ESIs can be expected to collect, analyze, and act upon intelligence (McQuiston, 2007; Honey, 2007) in a far shorter OODA loop than most Norms.

This capability is precisely what many believe is the direction military forces should—and inevitably, will—take in the future. Let us examine this tendency first from the perspective of potential enemies. The technology and abilities of ESIs are, as noted, in harmony with the conduct and purposes of espionage. They fit equally well with Fourth and Fifth Generation warfare (4GW and 5GW), which describe an enemy's increasing levels of decentralization within, and saturation of, a theater of operations, and its ability to use small, independent, undetectable, and embedded cells in waging war. Indeed, ESIs raise the specter of Sixth Generation Warfare (6GW), in which a field of operations is completely saturated by ESIs and smart machines that are, *in their essential nature*, "walking" weapons and intelligence-gathering agents. That is, they are pre-embedded with all they require to conduct hostilities. One human being can contain trillions of nanobots or genetically engineered germs that can be released anywhere and

anytime. Nanobots can perform any number of tasks, from attacking soldiers or civilians to collecting and transmitting biophysical or surveillance information. Elite ESI “super-warriors” no longer need to worry about hiding cumbersome equipment and weaponry; everything they need can be built into their bodies, from flexible armored skin to electromagnetic or sonic ray weapons. Robots operating with remotely guided animal/A.I. hybrid brains and able to take on multiple forms via nano-engineering will replace Improvised Explosive Devices (IEDs) with a vengeance.

In terms of one’s own forces, Bikram Singh (2004) points out that “the pronounced non-linearity and non-contiguity of an asymmetric warfare arena, blurs the front and rear boundaries of the traditional battlefield. In turn, this blurs the distinction between a logistician and a combatant and therefore, demands each and every soldier to be a more versatile multifaceted warrior. With regard to military leadership, it results in...strategic and operational military leaders...[becoming] increasingly involved in operations at tactical levels because of the need for enhanced monitoring of the overriding political, religious, legal or moral sensitivities of some operations” (Singh, 11). The traditional notion of logistics, strategy, and combat as discrete functions is obsolete. Today’s soldier—and, implicitly, intelligence operative—needs to have a wide-ranging set of physical and intellectual skills, precisely the sort of integrated functionality in which ESIs should excel. Singh goes on to note the greater “fatigue and stress levels” that these new responsibilities will engender (Singh, 11; Beaumont, 2007), which again means that the 21st century operative will need to have superior personal resources at his or her command in order to function effectively (DSO<sub>3</sub>, 2008).

Singh says that terrorists force an army to spread itself thin because it must cover every possible vulnerability; hence the army is weakened everywhere, a classic Sun Tzu formulation. Max Boot (2006) notes that “the proliferation of small arms can put even the most primitive foes on an almost equal footing with the representatives of the most advanced militaries....The American edge decreases considerably, however, when its troops have to deploy for peacekeeping or counterinsurgency operations which leave them exposed to low-tech ambushes. ‘With the possible exceptions of night-vision devices, Global Positioning Systems,



and shoulder-fired missiles,’ writes retired Major General Robert Scales, a former commander of the Army War College, ‘there is no appreciable technological advantage for an American infantryman when fighting the close battle against even the poorest, most primitive enemy.’”

This applies most acutely to 5GW and 6GW, only in the latter case, the vulnerability becomes total, resembling the board of the traditional Chinese game *wei chi* (known in Japan and the west as “go”), a 19x19 grid in which (unlike in chess or checkers) positions curl around themselves like entwined snakes, and a single point ignored for a hundred moves can suddenly become the explosive key to reversing, taking, and holding a position. Historically, terrorists equip themselves for a single strike; military operations are more sustained. In 5GW and 6GW environments, these multi-directional, very fluid “smart” forces can deliver far more destructive power for a more sustained period than a single terrorist attack. In fact, 5GW and 6GW resemble an unrelenting series of terrorist attacks masquerading as the activities of an army; nonetheless, it would not be accurate to equate such forces with terrorists or even traditional guerrillas, however much their tactics may resemble one another.

The same capabilities that make ESIs ideal for conducting Fifth and Sixth Generation Warfare make them ideal for countering these strategies. The “versatile multifaceted warrior” envisioned by Singh, and the military leader who combines the role of tactician and logistician (which requires effective intelligence), is perfectly suited to ESIs.

The same holds for intelligence operatives. ESIs have built-in advantages in unstructured environments. Agents will be easier to track, they will deliver real-time downloads from the field, and they will be able to coordinate their own intelligence with others networked directly through their minds or bodies. There is certainly a danger of networks malfunctioning or being violated by hackers. Technology’s disruptions occur differently from those afflicting organic bodies. If a piece of equipment malfunctions, the operative or soldier may be hurt or hindered. However, if an ESI’s technology malfunctions, the individual can be changed from within in unpredictable and potentially destructive ways. Guarding against malfunction and hacking will require

a new layer of organizational oversight (Coleman, 2008). Intelligence officers and military commanders will monitor the technology and information embedded in ESI operatives, but again, the technology components of an ESI are not merely components of a machine.

### ***Important Leadership Decisions***

One major decision area will involve deployment of ESIs. Much will depend on the rarity and perceived value not only of the individual but of the enhancement technology. Will “geniuses” be a dime a dozen? Does one “design” ESIs for specific operational purposes? (A large percentage of ESIs will be enhanced *after* birth and even after they have achieved maturity, so the idea of retro-fitting an ESI for a specific talent, job, or mission is not far-fetched). How does one assign ESIs who have multiple extraordinary skills? Risk assessment will be an important task in supervising ESI operatives, especially as losing an ESI may risk top-secret technology falling into enemy hands or entering the illicit global market. Value prioritization will involve deciding whether a high-end, high-functioning cyborg—let us say, one with synthetic skin that serves as a super-computer, powerful artificial intelligence programs that enable it to evade capture and improvise while in the field, nanobots able to disable combat forces or destroy an enemy facility—is worth risking soldiers for an attempted rescue. The answer might seem obvious—of course, one has to attempt the rescue of such a valuable super-weapon! However, if it is easy for both sides to engineer these ESI enhancements, the loss of this type of asset could seem no more significant than the loss of an armored vehicle with no human casualties.

Questions will arise in regard to leadership and management of ESI assets. In terms of the latter, the issues specific to ESIs are so bound up with technology development that it could take an entirely new intelligence organization to deal with them. This will undoubtedly encumber and muddle the task of managing ESIs with overlapping purviews and conflicts over turf, which underscores the need for clear-sighted and disinterested organizational planning. In terms of leadership, questions will arise whether ESIs of a certain type are best suited to run ESI assets or lead a group of high-powered ESI analysts. Much will

depend on the psychology of specific types of ESIs; in any case, close monitoring and evaluation of Norm-ESI and ESI-ESI relationships will clarify the various challenges of discipline, creativity, motivation, and loyalty that are perhaps more acute in intelligence contexts than within other types of organizations.

When any technology, much less several at once, undergoes explosive growth, bottlenecks appear throughout the infrastructural pipeline. It is not only on the front end, i.e., in terms of materials, vendors, production facilities, or trained personnel, that the pipeline gets blocked. Rather, the post-production end can be an even bigger problem because it is generally unrecognized and more systemic than supply-side problems. Because singularity technology will be so diverse and have so many applications, it is likely that only a few select possibilities will be pursued by the government, military, and corporations. Since this choice is generally determined by either 1) immediate need or 2) profit, a host of other potential development paths for ESIs will go unexplored. This is particularly dangerous if other parties develop ESIs with far superior potential to those in use by government agencies. Therefore, the emerging technologies needed to create ESIs will have to be “fast-laned.” What is needed is a sort of Office of Singularity Planning that is not subject to the direction of one “czar” or tight circle of palace guards. Evaluation and input should be conducted by a decentralized, open source network of scientists, engineers, ethicists, manufacturers, technicians, military and intelligence experts, and representatives from other relevant fields. Their work will include identifying industrial vendors who can best deliver the new ESI technology. Even the choice of ESI applications to be pursued and their prioritization can become very complex, not just because of contending interests but because of more subtle and profound issues, such as what type of new human entity will create the greatest good in the short and long term. It is not only inefficient to leave such decisions to the immediate needs of the military or intelligence communities or the profit calculations of corporations, it can be downright dangerous. Every type of ESI represents a highly charged potential to change society and to bring a new set of high-level skills into the world. It would be tragic, given the potential of this technology, if disproportionate investment went

towards the achievement of an ESI capable of fulfilling a very narrow set of skills.

In terms of efficiency and specific application to intelligence, ESIs can be programmed for skills that fit a given mission or provide instant expertise in a needed area. For example, when U.S. agencies at different times faced a shortage of personnel fluent in Russian, Arabic, Spanish, and Persian, singularity technology could potentially have endowed analysts with instant linguistic expertise (Olive, 2007). Insertion of genes for disease immunity, memory, and a host of high-functioning behaviors can all have profound impacts on the conduct of intelligence and the design of missions, but all the relevant technologies will not be available at once, nor will they always be at hand. A coherent approach to regulating the pipeline of incoming technologies requires leadership at all levels of the intelligence community as well as a broad-based strategic planning initiative.

Cloning foreign leaders and replacing them with covert agents is just one far-fetched application that may be realizable in the foreseeable future; similarly, a set of clones from a single source can be devastatingly effective as an intelligence asset. Nanotechnology and bioengineering will help deceive the biometrics that are an important part of counter-intelligence. We may one day have programs that replicate an individual's expertise and identity and that can be uploaded into another person, again with numerous intelligence applications. And conversely, how secure will any disguise be if ESIs can conduct DNA or brain scans (Keim, 2008) the instant they meet another person?

The dilemmas extend to the trend of outsourcing intelligence and security operations to private companies such as DynCorp and Blackwater. At some point, they will start employing ESIs and renting them out to corporations, foreign countries, or cartels with no government oversight. This will raise a host of issues pertaining to national security and technology transfer, as well as opening the door for underground and criminal use of ESIs. It also means that many ESIs will be operating without any public-interest oversight, and increases the chance that unintended social effects will go undetected.

Another type of ESI we have not mentioned is the “virtual world avatar.” An avatar is an individual’s representative in online worlds such as Second Life, in which millions of people participate in a society that they create in a shared online space. Anyone can enter at no immediate physical risk, and this safe environment provides endless opportunities for information gathering, deep cover, and covert communication. In this case, the “avatars,” the online personae that operate in these cyber-worlds, become a sort of ESI unconstrained by the limits of real time, space, and material reality. Already a flourishing real-money economy exists in Second Life. A pedophile ring was discovered operating on Second Life engaged in pedophilia using other “avatars.” Virtual gangs control and intimidate many of the virtual-world businesses that people’s avatars establish there. Whether these activities have spilled over into the real world is unclear. However, where mutual interests are being pursued in the safety and anonymity of an online world, the potential exists for the participants to conspire in real-world illegal activities, such as exchanging child-pornography or engaging in criminal conspiracy. In another vein, Sweden (BBC, 2008) and the Maldives (Page, 2007) now have embassies in Second Life, and IBM and other companies have virtual headquarters there as well.

These worlds offer secure communication. Avatars can exchange real-world information in deep cover. As users create virtual worlds nesting inside virtual worlds, it is very likely that intelligence agencies will find this realm, in which individuals operate outside of Norm restraints, a sort of 1960s Vienna of the mind. Terrorist cells can organize themselves in these worlds and, if actual identities are discovered, can always claim, as the defenders of the virtual-world pedophiles did, that they were only pretending. At any rate, criminal activity, in one form or another, is already being conducted in this non-dimensional world that is expanding at an extraordinary rate.

Psychological operations (PsyOps) have long been a purported specialty of intelligence agencies and they can be considered a natural part of their practice. PsyOps can be categorized according to a pair of distinct dualities. The first is that between external and internal practice, such as in the contrast between propaganda and mind control, the former relying upon extrinsic influences from outside the target

and the latter seeking to insinuate an agent of influence within the target's psyche. The second duality distinguishes methods that interfere with the cognitive facilities of a target individual or population and methods that enhance the mental operations of one's own operatives or population. In the Singularity Era, both these divides, as so much else, will at least partially dissolve.

DARPA is working on a number of sophisticated brain-enhancement programs (Goldblatt, 2002) that may one day entirely recast the notion of PsyOps. Chemical and electromagnetic stimulation of the brain to produce exceptional mental performance, and implants that stimulate the brain in pre-specified ways may produce the first generation ESIs. The first ESIs may be no more effective than Norms who ingest a drug to improve their performance for a given task or mission. However, the key to the singularity is that technology becomes an integral part of an individual's life and character. Memory and learning abilities may be enhanced via a number of means, including lowering gamma-aminobutyric acid levels in the brain (Moreno, 122), using transcranial magnetic stimulation (Moreno, 18), or implanting an artificial hippocampus and olivocerebellar region in the brain (Kurzweil, 188), which would in turn enhance the ability of agents or analysts to record and process information (DSO<sub>1</sub>, 2008). Recent work on the RNA of fruit flies and mice has identified genes responsible for neuronal growth in the brains of those species, and "the system [used] also provides greater opportunity to find genes necessary for neuronal development and function through screening" (Sepp et al, 2008); such work could one day provide the basis for dramatic expansion of human intelligence.

Remote control of behavior may be achievable using implants in the target (Moreno, 43–46) or technologies that override normal brain function by influencing blood flow within a target's brain or other organs (Moreno, 13). Instead of attempting remote viewing by (purportedly) projecting a stationary viewer's consciousness to a distant site, nano-receptors embedded on-site or in individuals—with or without their cooperation—can transmit information at a level of detail superior to other methods because the data is being gathered from innumerable sources (trillions of nanobots, for example), each with its own perspective,

including some embedded in an on-site individual's blood, skin, or brain. Even today's technology can read changes in body chemistry and determine which brain areas a person is using. ESIs for whom these abilities are an integral part of their psyche will be far more efficient than *any* external system of support, even if that support includes real-time downloads of changing situational variables. The range of tasks is potentially diverse: influencing others' minds remotely, absorbing vast volumes of data, conducting instantaneous analysis with a networked host of experts in other locations and devising an appropriate response. The notion of "sharpening networks into usable weapons" (Honey, 2007) takes on entirely new meaning when the hub of the network (a single ESI) is conducting all operations—analysis, tactical decision making, logistical calculations, communications—instantaneously and with full mobility. One risk, as noted in the scenarios, is that ESIs will improve and expand their competencies in ways their commanders or "handlers" never anticipated.

Robotics, nanotechnology, and advanced materials development will enable ESIs to endure extreme climates, repel bullets, or perhaps even fly with aero-gel wings. Already one can purchase retail devices whose flashing lights or sonic waves cause nausea or other disabling feelings (Mindmodulations.com, 2007), and wave technology—identified in the popular mind with "death-rays." etc.—will also become a feature of ESIs, especially as the technology has so many uses other than as weapons: remote sensing, cutting or drilling materials, communications, or even diagnostic and healing purposes. Robotics will allow individuals to use their limbs as weapons, the plasticity of which can only become more and more elegant and versatile. Nanotechnology offers the potential to morph clothing and seemingly trivial objects into weapons or sensing devices. All this plasticity will complicate physical concealment of equipment and weapons and personal disguise. In 2007, scientists created genetically modified "super-mice" with extraordinary physical capabilities. While their aim was not to apply these procedures to humans, they noted that it is quite possible that the technology "could one day be used to 'enhance' the natural abilities of athletes" (Connor, 2007). Electromagnetic, photonic, biometric, and sonic probes capable of unmasking ESIs will require sophisticated blocking technology, and there will surely be a leapfrogging contest between ESIs' protective



and disguise-oriented technologies and the corresponding counter-measures.

An Israeli scientist has just invented an exo-skeletal suit that enables paraplegics to walk again (Rabinovitch, 2008), and indeed, a whole reparative technology is emerging that bypasses the physical damage that causes paralysis, blindness, and other disorders by operating directly on the unimpaired brain centers that control those activities (Sender, 2004; Chu, 2008). Meanwhile, scientists are developing invisibility suits ("Scientists," 2008), while Cyberdyne, Inc., is working on a robotic strength-enhancing suit intended to be worn by individuals for a variety of tasks (Cyberdyne, 2008). At some point, suits and other external frames will be cast aside as technology fuses with the body. Field agents and soldiers will fix injury, illness, or damaged equipment using built-in reparative enhancements.

ESIs' ability to operate at a higher level of abstraction and complexity than Norms may well boost analysts' status and power. The more automatically and rapidly one utilizes information, the more creative one can be because creative energy and time are not required to achieve insights and perspectives that occur automatically to the enhanced mind. Also, the seamless interface with computer programs and networks that, for field operatives, will blur the line between covert and analytic functionality will do the same for ESI analysts who can react quickly and strategically to their own analyses.

### ***Organizational Issues***

A key organizational leadership challenge lies in the general human tendency—to which the intelligence community is particularly vulnerable—to devise operations that test the dazzling possibilities of sexy new technologies while overriding the protocols of effective strategic development. When ESIs come on the scene, this attraction will be irresistible. The integration of ESIs *should* be governed by ongoing strategic considerations, standard planning procedures, and continual and thorough assessment of ESI performance in a variety of situations; but the temptation to set them loose to prove a point, justify an investment, or just see how they run could result in fatal and costly mistakes.



A key to the measured integration of ESIs into the intelligence services lies in evaluating not only ESIs' performance, but the experience and performance of their supervisors. Because ESIs represent such a unique case, such evaluation should be conducted by inter-disciplinary, cross-agency, and cross-functional groups. The familiar caution is more important than ever in this regard. ESIs do not simply represent a new technology, capability, or approach to training incoming employees. They represent a *singularity*, a different type of human being and human asset, and their presence imposes change upon deeply engrained leadership, managerial, and organizational norms, change that requires a steady hand and disinterested oversight.

ESIs may be reluctant to delegate work or authority, given their high energy and intelligence. They may be dismissive of Norm peers, overconfident in their own judgment, and resistant to the imposition of authority by less-talented Norms. Many will certainly have low tolerance for bureaucratic procedures, which could serve as a much-needed corrective to current organizational norms.

The susceptibility of U.S. intelligence agencies to infiltration has been a challenge since their inception. Counter-intelligence where ESIs are concerned takes on a whole new meaning. What if a non-sentient part of an ESI is compromised; for example, if the individual is loyal, but their implanted circuitry has been hacked? Can hostile agents be customized to replicate our own operatives? Can ESIs' knowledge or network capabilities be hijacked by, or downloaded into, enemy ESI agents? Many such conundrums will confront intelligence agencies in a future when counter-intelligence will be more important than ever, given the skills of antagonists' ESIs and the chance of ESI technology falling into the wrong hands—although an agency that too vehemently pursues counter-intelligence due to mistrust of ESIs and their vulnerabilities can neutralize itself. Added to this will be the difficulty of fully vetting ESIs; vetting will involve more sophisticated technological procedures and will presume an ability to penetrate ESI minds that, by definition, may be beyond the reach of the usual vetting procedures. How does one identify other systems and content implanted along with ESIs' specified enhancements? Betrayal by a mole or enemy agent is possible, but even more likely is betrayal from within

the scientific institutions and corporations that develop and maintain ESI technology. There, among employees with no direct connection to the intelligence community, and with less rigorous oversight and more diversity of economic and professional interests than intelligence agencies, the chances of ESIs being compromised rise dramatically.

## **VII. Final Considerations**

It is possible to view the singularity as an afterword, just one more step in the march of machines that follows the curve of technological development whether as a steady upward climb or steepening logarithmic slope. If that were so, there would be nothing singular about these technologies. Technology has already taken up residence within the human body in the form of heart valves, arterial stents, artificial hearts, metal pins and plates, etc. Already, ear-attached Bluetooth devices bestow a distinctly alien quality on their chatting users, while some people and more pets wear implanted microchips. Many lives are spent immersed in computer games and virtual worlds. Parents and pundits may bemoan the fact that their kids are hooked on online reality and losing the organic sense of community and interpersonal relationships that marked the pre-digital age, but these trends are only in their infancy.

Even without the singularity, its related technologies will have momentous impact on all aspects of our lives. For example, those with access to nanotech-based medical treatments will likely live longer, work more productively, and enjoy a better quality of life than those without, as is true today for those who enjoy top-flight medical care. Since nano-techniques represent a quantum leap over today's medical procedures, the health gap between those with and without access to the best doctors and hospitals will only continue to widen. The same applies to access to tera- and peta-level desk-top computing, robotic and synthetic tissue repairs to the body, and advanced learning programs and technologies. Many of the leadership trends discussed within these pages will manifest simply because we are on the verge of a momentous shift in technology on so many fronts, and these cannot help but have a transforming effect on people's lives at the most fundamental level.

Such claims are not based on the Late Victorian and Edwardian futurism of H.G. Wells, Edward Bellamy, Jules Verne, and the great expositions of the 1890s and early 1900s. In the first place, we have today many, many times more experience observing the course of technological development than people did one hundred or even fifty years ago. The study of innovation, the history of technology, and the social impact of the machine have produced a substantial literature from both theoretical and practical perspectives. We have a pretty good sense of where nanotechnology, super-computing, materials development, organ regeneration, and brain science are headed because the approaches and methods already in use point the way much more clearly than they did twenty years ago. We know that quantum computing or protein-based computing or some silicon hybrid is feasible. We know that nanotechnology works. We have had tremendous success in deciphering the genetic code and neurological processes. Further to the point, scientists and engineers now know enough to get a glimpse of what we do not know and the vast potential that may reside in those unexplored regions.

These singularity technologies have key elements in common with the core transformative elements of all systems, be they inorganic, biological, social, abstract, or technological.

1. *Power*: they allow us to do more and exert greater control over the physical world.
2. *Miniaturization*: that power is packed into smaller and smaller packages, down to atom-sized machines.
3. *Speed*: the speed of all processes is accelerating, which changes the fundamentals of business, politics, economics, relationships, etc.
4. *Materials*: new materials that achieve extraordinary effects are created on a daily basis.
5. *Convergence*: the applications of all these technologies are converging. Faster computers affect every field; nanotechnology promises quantum leaps in bioengineering, brain work, etc. New materials can be designed to achieve a host of envisioned

effects. The convergence point seems to be the human mind and body.

6. *Interface*: there is no question that, given the first five elements, these technologies will inevitably be integrated into the human body and brain. Not only is the technology increasingly available, but the will is there as well. The ability to enhance human power has been a staple of myth and popular culture at least since the Gilgamesh epic sold out its first edition in ancient Sumeria, and self-improvement is virtually a religion, with hundreds of millions of devout adherents.
7. *Exponential Effects*: the convergence of these technologies and their eerily “unnatural” effects mean that their impact on society will be largely unforeseen not only by the general population, but even by informed policy makers of all stripes. They will be agents of immense and abrupt change in every aspect of life and within every human system. The effects will be exponential, which is why it is a good idea to start thinking now in some detail about what they might be.

These trends make the singularity virtually inevitable. When the seven elements described above are actualized within the human system and then undergo the rapid improvement that we can anticipate once they gain a foothold, humanity will have indeed entered a new phase of evolution that imposes a rethinking of all previous norms.

The most advanced research is usually conducted in secret. Whatever the public sees as the current state of technology has likely already been taken up by government and military laboratories the world over. The Pentagon, for example, is already experimenting with brain implants aimed at producing “super-warriors” (Floyd, 2003, Ayers, 2008; Moreno, 39-40; 114 ff.). Developing ESI abilities is a very different animal—and a more complex one—from mind-control experiments. It is far easier to suppress mental activity and brainwash the mind to respond to a narrow range of stimuli than it is to expand and enhance it. Even a single kidnapper can impose the former conditions on a victim, while mind expansion is still largely the purview of independent, amateur investigators. Nonetheless, Lozanov’s work on accelerated

learning in Bulgaria, various experiments with remote viewing and other psychic phenomena, etc., indicate that such efforts are underway. Whether they are being conducted as efficiently and fruitfully as they might be is another unknown, but ESIs with outstanding mental powers may appear well in advance of their current estimated time of arrival. Certainly computer/brain interfaces, already envisioned in some detail in imaginative fiction (Bury, 1994), are likely to be more advanced than is currently publicly known.

Aside from the products of advanced labs, humanity will be instantly exposed to the equivalent of ESIs when and if we make contact with extraterrestrials (ETs), whether via SETI-like communications or their arrival on our planet (begging for the moment the question of whether they exist at all). ETs, however, may be based on completely different biological and chemical, if not physical, laws from ourselves. It is likely that we would project our own emotional and intellectual frameworks onto their behavior and “personalities” long before we understand their true character and intentions. This is a principle that will probably apply to all Norm-ESI interactions. Conversely, just as a math prodigy, for example, often cannot comprehend why others have trouble grasping such “simple” things as calculus or topology, ESIs may find it difficult to understand Norms’ points of view. In any case, any contact with extraterrestrials will pose cross-cultural difficulties more similar to those experienced between Norms and ESIs than those pertaining to members of two different Earth cultures.

Two other technologies may have a major role to play in producing the singularity. The first is the resonance-based technology of Nicola Tesla. Although Tesla did not leave behind a major corporation as Edison did, his work was so advanced and valuable that it quite likely has been pursued by governments, militaries, and advanced corporate labs for decades. While Tesla’s work did not directly address human performance, it did lend itself to tapping into immense sources of energy. The principle of resonance in general has many implications for wave-based technologies, all of which can have a direct bearing on high-end mental abilities. It is impossible to imagine all the development paths that lead from Tesla’s technology, but again, Tesla’s work may well play an important role in the emergence of ESIs.

The second source is the revival of ancient technologies. In assessing them, it is useful to clear away the wishful and extravagant claims of New Age writers who often rely on fragments of information or unfounded claims. Nonetheless, there is at least a possibility that the ancients used crystals, acoustics and resonance-based energies, quantum energy sources, and sophisticated engines in building their civilizations. Much depends on whether one believes the orthodox timeline of human history in which the end of the last Ice Age some 12,000 years ago marked the beginning of civilization's gradual climb from primitivism to agriculture, ceramics, settlements and cities, the arts of war and peace, and rationality and science. The alternative view is that other civilizations preceded the one that grew out of the Mesolithic (ca. 10,000-8,000 B.C.E.) and Neolithic Eras (ca. 8,000-4,000 B.C.E.) and that they possessed very sophisticated technologies described in myth. Certainly the brain-training and physiology-training techniques of yoga, meditation, and martial arts represent a full-blown ESI technology whose depths our own culture has barely sampled.

A common critique of technology asserts that it has caused human beings to become insensible to their own mental powers and to nature's energies. Rather than viewing modern intellect as the crowning achievement of evolution, we might say we have driven our perceptions and energy into the service of a specific matrix of cognitive traits that pertain to logical analysis and mastery over matter through the medium of external tools. Recent works on the perceptual powers of the human heart (Buhner, 2004) and the "consciousness" of plants (Narby, 2006) indicate in scientific terms the powers of perception and consciousness sited outside the brain, powers that may have been tapped by non-industrial societies.

For now, it is enough to note that alternative cognitive technologies may reside within the human bio-electrochemical system. This includes the possibilities of "quantum consciousness," in which those who master the play of "chi" or "ki" and Zero-Point energies within the body make contact with quantum energy states, which would provide another front in the general advance of singularity technology and another path to the emergence of ESIs. At the same time, biofeedback programs are becoming more powerful, and within a few years, biofeedback

equipment may be able to interact with the limbic brain, which current systems cannot achieve. Of course, if that is almost available to the public, more sophisticated laboratories are probably already there; the technology required is not particularly advanced, and biofeedback is one more path that could lead to the singularity.

Ultimately, leadership will be the cultural domain most profoundly impacted by ESIs, as we have seen. Leadership is at the hub of almost every social activity. Leadership is traditionally based on some claim of superiority, be it talent, force, insight, influence, or divine will. Whatever traits define a given leader, they are always framed in terms of ability and competency, or the lack thereof. The singularity represents a direct assault on the standards upon which competency has been based for as far back as inquiry can determine. Perhaps the contrast between Cro-Magnons and Neanderthals, played out 50–30,000 years ago, is the closest approximation we can imagine to the relationship of ESIs to Norms.

If any reliable guide exists for coping with the singularity's challenges, the realm of ethics will provide it. Certainly singularity technology, emerging from the most advanced, well-funded labs that belong to or are funded by large corporations, the government, and the military, will be controlled by society's most powerful and influential interests. Thus, ESIs' abilities can be easily leveraged to increase the economic advantage and political authority of those who already have the most substantial portion of both, whether or not those powerful individuals are themselves ESIs. If our inquiry has made anything clear, though, it is that the rise of ESIs will undermine the assumption that the "power elite" will automatically prevail in the face of ESIs with far superior intelligence and technological expertise. Nevertheless, the political system will face a grave choice in deciding whether to use the advances of the singularity and the talents of the ESIs to democratize society—national and global—and improve the standard of living of the disadvantaged, or whether it will apply these powers to the exercise of self-aggrandizement, exploitation, and control by the few.

That, however, is a story that long precedes our own time, much less the future arrival of the singularity, and it might seem that the

likelihood of it being resolved soon is remote. But even this may not be the case, for the singularity and the increasing numbers of ESIs will also change the most fundamental rules of the human “game.” The level of intelligence and physical well-being ushered in by the human singularity could lead to another type of singularity, a “historical singularity.” It could turn out to be a condition of absolute totalitarian global control. Or we may witness its opposite: a dramatic rise in collective wisdom that results in the emergence of a new set of social rules that transform society into a fair and just system that would have remained forever dormant without the contributions of ESIs.

## VIII. Recommendations

*These people coming in at random are carrying in the greatest marvel of all times – the human minds that took hundreds of millions of years to make. We as technologists in industry do not use these minds at all...The way industry treats these human minds [who] walk through the personnel door is equivalent to IBM dropping its computers from its highest windows just to test Galileo’s law of falling objects...[Let us develop] a new art and a new science which...examines the question of ‘How do you use human minds?’” – Dr. Edwin Land (14-15)*

The following recommendations provide an initial framework for preparing leaders for the Singularity Era.

### *Preparation*

- Assess status of core singularity technologies for their likelihood of achieving techno-biological integration.
- Develop time lines, both probable and optimal, for achieving this integration.
- Formulate a list of performance benefits to be gained from each.
- Design specific development paths to create ESIs as quickly as possible.



- Identify all resources currently being applied to achieving the singularity or that can be directed towards that goal.
- Identify institutions most able to contribute to this effort.
- Develop innovative R&D networks that will best facilitate the project.
- Put in place a mechanism to provide a continuing strategic, tactical, and logistical overview and analysis of progress.
- Create a special office to channel new technologies and advances into the effort as they arise.
- Conduct symposia and conferences for top thinkers and researchers in the field.

### *Training and Education*

- Determine a series of pilot training and education programs and identify participants.
- Shift leadership training towards structural models that enable a broader and more contextual approach to leadership.
- Conduct advanced brain-training that enhances all levels of thinking skills (Kunstler, 2005).
- Develop sophisticated simulations in which participants operate from the perspectives of ESIs and Norms interacting with ESIs.
- Develop multi-player video games that simulate ESI experiences and capabilities. Use Virtual Reality and virtual worlds as well.
- Research the impact of ESI enhancements on human systems.
- Explore perceptual and cognitive properties of body-centers other than the brain, i.e., heart, spine, solar plexus.
- Orient participants to the plasticity of space and time via advanced meditation, kinesthetic, and visualization techniques. Find applications for these perspectives.
- Inculcate participants with the most advanced algorithms for rapid problem solving and for enhancing interactional outcomes with groups or individuals.

- Distill expert thinking and behavioral patterns in various fields and use them as the basis for training programs. (See Cerebyte section in *The Hothouse Effect* [Kunstler, 2004]).
- Raise intellectual capital of participants by teaching the historical and social contexts of leadership and technology.

### ***Oversight***

- Use a modified open source process that draws upon experts from many fields: technology, law, psychology, history, ethics, science, intelligence, military, engineering, etc.
- Select members of a coordinating committee that integrates all input. Construct feedback loop back to open source contributors to prevent undue influence by coordinating committee.
- Track emerging technologies for advances in singularity technology and develop procedures for applying these to the overall project.
- Continually improve leadership training in light of increased understanding of the singularity's impact.
- Keep project oversight decentralized. Because it is proceeding on so many different fronts, too much control will reduce the odds of discovering effective applications.
- Develop active networks of experts with high percentage of cross-disciplinary links.
- Monitor the status of ESI-technology among governments, corporations, and militaries world-wide.

### ***Implementation***

- Identify the likely places of origin of the first ESIs: corporate labs, military, private medical facilities, etc.
- Implementation should be based on a wide-range of strategic considerations rather than the pet objectives of a given agency.
- Determine which ESIs will emerge “naturally” into society (for example, as the result of parents utilizing the services of a bioengineering firm) and which will likely emerge under

institutional control (i.e., a “super-warrior” in an experiment at a military base).

- Develop applications for ESIs in a variety of fields on an ongoing basis.
- Continue efforts in Preparation, Training, and Oversight in order to build out an industry that enhances mental and physical gifts in the entire population.
- Promote open debate, inquiry, and reflection over the societal implications of ESIs.
- Implement and promote Phase 9 leadership programs.

## References

- Axel, Richard. "Scents and Sensibility: Towards a Molecular Logic of Perception." Speech at "Columbia 250," 2004, [http://c250.columbia.edu/c250\\_events/symposia/brain\\_mind/brain\\_mind\\_vid\\_archive.html](http://c250.columbia.edu/c250_events/symposia/brain_mind/brain_mind_vid_archive.html), (current as of September 9, 2008).
- Ayers, Tiffany. "Super Warriors: New technologies could give American troops super-powers." *Military Officer*, [http://www.moaa.org/Magazine/January2003/f\\_superwarriors.asp](http://www.moaa.org/Magazine/January2003/f_superwarriors.asp) (current as of September 4, 2008).
- Barabasi, Albert-Laszlo. *Linked: The New Science of Networks*. Cambridge, MA: Perseus Publishing, 2002.
- Beaumont, Peter. "Fatigue Cripples US Army in Iraq." *The Observer*, August 12, 2007.
- Biever, Celeste. "Brain-implant enables mind over matter." *NewScientistTech*, July 12, 2006, <http://technology.newscientist.com/article.ns?id=dn9540&print=true> (current as of September 9, 2008).
- Boot, Max. "The Paradox of Military Technology." *The New Atlantis*, Fall, 2006.
- Buchanan, Mark. *Nexus: Small Worlds and the Groundbreaking Science of Networks*. NY: W.W. Norton and Company, 2002.
- Buhner, Stephen Harrod. *The Secret Teaching of Plants in the Direct Perception of Nature*. Rochester, VT: Bear and Company, 2004.
- Bury, Stephen. *Interface*, NY: Bantam Books, 1994.
- Caillois, Roger. *Man, Play, and Games*. Trans. by Meyer Barash. New York: Schocken Books, 1979.
- Canada, Geoffrey. *Fist, Stick, Knife, Gun*. Boston: Beacon Press, 1995.
- Chu, Jennifer. "A Prosthesis for Speech." *Technology Review*, July 3, 2008, <http://www.technologyreview.com/Biotech/21037/?a=f> (current as of September 9, 2008).
- Coleman, Kevin. "Cyber Soldier of Fortune." September 8, 2008, DefenseTech.org, [http://www.defensetech.org/archives/cat\\_cyberwarfare](http://www.defensetech.org/archives/cat_cyberwarfare).
- Connor, Steve. "The mouse that shook the world." *The Independent*, November 2, 2007, <http://www.independent.co.uk/news/science/the-mouse-that-shook-the-world-744870.html> (current at September 9, 2008).

- “Cyberdyne: Robot Suit Hal,” <http://www.cyberdyne.jp/english/robotsuithal/index.html> (September 4, 2008).
- DefenseTech* “Replacement Arm, Good as New,” <http://www.defensetech.org/archives/001478.html> (accessed September 4, 2008).
- DSO<sub>1</sub> – Defense Sciences Office, <http://www.darpa.mil/dso/thrusts/trainhu/nia/index.htm> (accessed September 9, 2008).
- DSO<sub>2</sub> – Defense Sciences Office, <http://www.darpa.mil/dso/thrusts/trainhu/accelerated/index.htm> (accessed September 9, 2008).
- DSO<sub>3</sub> – Defense Sciences Office, <http://www.darpa.mil/dso/thrusts/trainhu/warfighter/index.htm> (accessed September 9, 2008).
- Doornick, Robert. Telephone interview by Barton Kunstler (Connecticut: February 28, 2006).
- “Feelix-Growing Portal,” <http://www.feelix-growing.org/> (current as of September 9, 2008).
- Flavin, William. *Civil Military Operations: Afghanistan: Observations on Civil Military Operations During the First Year of Operation Enduring Freedom*. U.S. Army Peacekeeping and Stability Operations Institute: 2004.
- Floyd, Chris, “Monsters, Inc.: The Pentagon’s Plan to Create Super-Warriors.” *Counterpunch*, January 13, 2003.
- Goldblatt, Michael. “Office Overview.” DARPA Tech 2002 Symposium, [http://www.darpa.mil/darpatech2002/presentations/dso\\_pdf/speeches/GOLDBLAT.pdf](http://www.darpa.mil/darpatech2002/presentations/dso_pdf/speeches/GOLDBLAT.pdf) (current as of September 9, 2008).
- Hall, J. Storrs. “Runaway A.I.?” *The Futurist*, March-April, 2006.
- Halperin, Karin. “Malbec or Merlot? Ask an E-Tongue.” New York: ABC News, April 3, 2008, <http://abcnews.go.com/Technology/GadgetGuide/story?id=4576094&page=1>
- Hesse, Hermann. *Magister Ludi*. New York: Bantam Books, 1982 (1943).
- Hodgkinson, G.P., J. Langan-Fox, and E. Sadler-Smith, (2008). “Intuition: A fundamental bridging construct in the behavioural sciences.” *British Journal of Psychology*, 99, 1-27. Also at [http://www.leeds.ac.uk/media/press\\_releases/current/intuition.htm](http://www.leeds.ac.uk/media/press_releases/current/intuition.htm).
- Honey, David. “Sharpening Networks into Usable Weapons.” DARPA Tech, DARPA’s 25<sup>th</sup> Systems and Technology Symposium.
- Huxley, Aldous. Interview with Mike Wallace, CBS-TV, aired May 15, 1958.

- Jackall, Robert. *Moral Mazes: The World of Corporate Managers*. New York: Oxford University Press, 1988.
- Johnson, Stephen and David B. Muhlhausen, "North American Transnational Youth Gangs: Breaking the Chain of Violence." <http://www.heritage.org/research/urbanissues/bg1834.cfm>, March 21, 2005 (current as of September 4, 2008).
- Joy, Bill. "Why the Future Doesn't Need Us." *Wired*, 2000 (Volume 8.04).
- Keim, Brandon. "Brain Scanner Can Tell What You're Looking At." [http://www.wired.com/science/discoveries/news/2008/03/mri\\_vision](http://www.wired.com/science/discoveries/news/2008/03/mri_vision) (current as of September 9, 2008).
- Kunstler, Barton. "The Ancient Oracles Still Speak: Recasting Forecasting for the 21st Century." in *Seeing the Future Through New Eyes*, edited by Cindy Wagner (Bethesda, MD: World Future Society) 2008.
- . "An Educational Approach for an Era of Profound Technological Change," in *Foresight, Innovation, and Strategy: Toward a Wiser Future*, edited by Cynthia G. Wagner (Bethesda, MD: World Future Society) 2005.
- . *The Hothouse Effect*. New York: Amacom, 2004.
- . "A Conversation on Holographic Teaching," in *Proceedings of the World Association for Case Method Research and Application Conference*, Marseilles, 1998. Fall, 1998.
- Kurzweil, Ray, *The Singularity is Near: When Humans Transcend Biology*. London: Penguin Books, 2005.
- Land, Edwin, "The Second Great Product of Industry: The Rewarding Working Life," in *Science and Human Progress*, Pittsburgh: Mellon Institute: 1963.
- Leopold, Jason. "U.S. soldiers launch campaign to convert Iraqis to Christianity." *Online Journal*, June 2, 2008. [http://onlinejournal.com/artman/publish/article\\_3318.shtml](http://onlinejournal.com/artman/publish/article_3318.shtml) (current as of September 9, 2008).
- Lessig, Lawrence. *Code and Other Laws of Cyberspace*. New York: Basic Books, 1999.
- McQuiston, Barbara. "The Ultimate Q." in DARPATech, DARPA's 25th Systems and Technology Symposium.
- McTaggart, Lynne, *The Field: The Quest for the Secret Force of the Universe*. New York: Harper, 2008.

- Mindmodulations, "Flashlight Weapon Makes Targets Throw Up." <http://www.mindmodulations.com/mindmods/general/flashlight-weapon-makes-targets-throw-up.html> (August 9, 2007, current as of September 4, 2008).
- Mitchell, David. *Cloud Atlas*. New York: Random House, 2004.
- Moreno, Jonathan D. *Mind Wars: Brain Research and National Defense*. New York: Dana Press, 2006.
- Mori, Masahiro. "Bukimi no tani," The uncanny valley (K. F. MacDorman & T. Minato, Trans.). *Energy*, 7(4): 33–35.
- Narby, Jeremy. *Intelligence in Nature: An Inquiry into Knowledge*. New York: Tarcher/Penguin, 2005.
- Olive, Joseph. "Language Translation." in DARPATech, DARPA's 25<sup>th</sup> Systems and Technology Symposium.
- Oshry, Barry. *The Possibilities of Organization*. Boston: Power and Systems (1986, 1992).
- Page, Jeremy. "Tiny island nation opens the first real embassy in virtual world." *Times Online*, May 24, 2007, [http://technology.timesonline.co.uk/tol/news/tech\\_and\\_web/article1832158.ece](http://technology.timesonline.co.uk/tol/news/tech_and_web/article1832158.ece) (current as of September 4, 2008).
- Pollitt, Michael. "More than Meets the Eye – The LED Contact Lens." *The Guardian*, July 4, 2008; also at <http://www.nano.org.uk/news/july2008/latest1473.htm> (current as of September 4, 2008).
- Przewoznik, Jan and Marek, Soszynski. *How to Think in Chess*. Milford, Connecticut: Russell Enterprises, 2001.
- Rabinovitch, Ari. "Human exoskeleton suit helps paralyzed people walk." Reuters, August 25, 2008, [http://news.yahoo.com/s/nm/20080825/sc\\_nm/technology\\_paralysis\\_dc](http://news.yahoo.com/s/nm/20080825/sc_nm/technology_paralysis_dc) (current as of September 4, 2008).
- Rose, Colin. *Accelerated Learning*. New York: Dell, 1985.
- Sepp, Katharine J., Pengyu Hong, Sofia B. Lizarraga, Judy S. Liu, Luis A. Mejia, Christopher A. Walsh, and Norbert Perrimon, "Identification of Neural Outgrowth Genes using Genome-Wide RNAi," in *PloS Genetics*, <http://www.plosgenetics.org/article/info%3Adoi%2F10.1371%2Fjournal.pgen.1000111> (current as of September 9, 2008).

- “Scientists closer to developing invisibility cloak.” Associated Press, August 11, 2008, [http://news.yahoo.com/s/ap/20080811/ap\\_on\\_sc/sci\\_invisibility\\_cloak](http://news.yahoo.com/s/ap/20080811/ap_on_sc/sci_invisibility_cloak) (current as of September 4, 2008).
- “Scientists stop the aging process,” ABC Science, August 11, 2008, <http://www.abc.net.au/science/articles/2008/08/11/2331197.htm?site=science> (current as of September 9, 2008).
- Sender, Aaron J. “Neuroscience: John Donoghue.” in *Discover*, November 25, 2004, <http://discovermagazine.com/2004/nov/neuroscience> (current as of September 9, 2008).
- Singh, Bikram. *Touchstones for the Military Leadership Engaged in Asymmetric Warfare*. U.S. Army Peacekeeping and Stability Operations Institute: 2004.
- Sofge, Erik. “Souped-Up Contact Lenses Promise On-Demand Bionic Eyesight.” *Popular Mechanics*, April, 2008, [http://www.popularmechanics.com/science/health\\_medicine/4252012.html](http://www.popularmechanics.com/science/health_medicine/4252012.html) (current as of September 9, 2008).
- “Sweden plans Second Life embassy,” BBC News, January 29, 2007, <http://news.bbc.co.uk/2/hi/europe/6310915.stm> (current as of September 4, 2008).
- “The MS-13 Threat: A National Assessment.” [http://www.fbi.gov/page2/jan08/ms13\\_011408.html](http://www.fbi.gov/page2/jan08/ms13_011408.html) (January 14, 2008, current as of September 4, 2008).
- “U.K. approves human animal hybrids,” in *Cosmos: The Science of Everything*, March 6, 2007, <http://www.cosmosmagazine.com/news/1564/uk-approves-human-animal-hybrids> (current as of September 4, 2008).
- Vinge, Vernon. “The Coming Technological Singularity: How to Survive in the Post-Human Era” (1993), <http://www-rohan.sdsu.edu/faculty/vinge/misc/singularity.html>, or in *Whole Earth Review*, Winter 1993.
- . “Signs of the Singularity,” in *Spectrum*, journal of the Institute of Electrical and Electronics Engineers, “The Singularity: A Special Report” (2008). Also at <http://spectrum.ieee.org/singularity>.
- Westphal, Uwe. *The Bauhaus*. New York: W.H. Smith Publishers, 1991.